

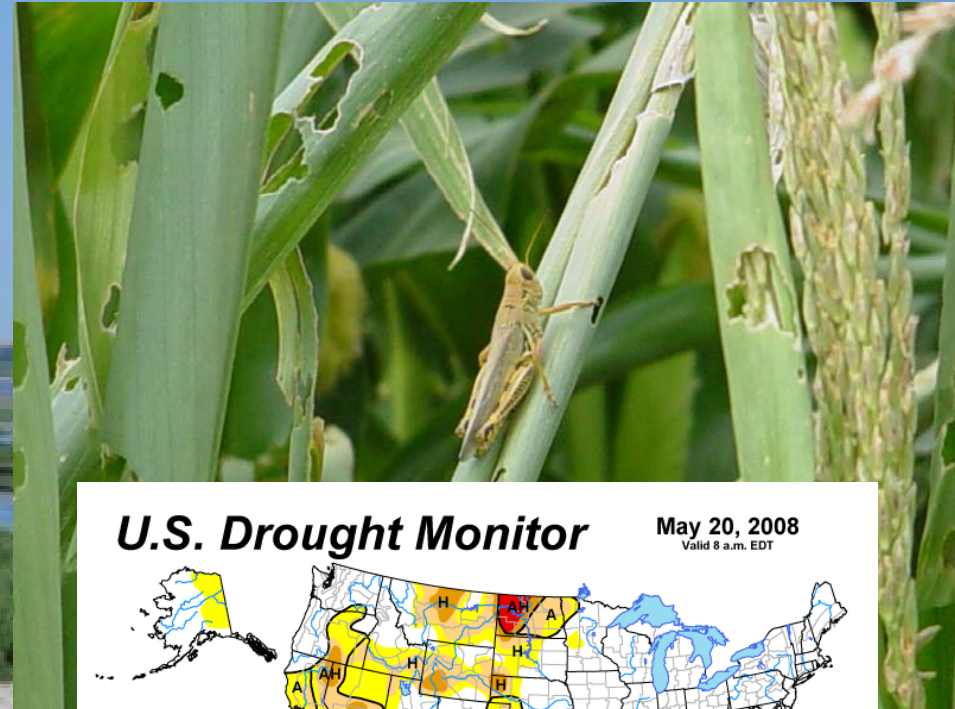
# *The National Integrated Drought Information System (NIDIS) and the Evolution of a Decision Support System*

Brian Fuchs, Climatologist

National Drought Mitigation Center

School of Natural Resources

University of Nebraska

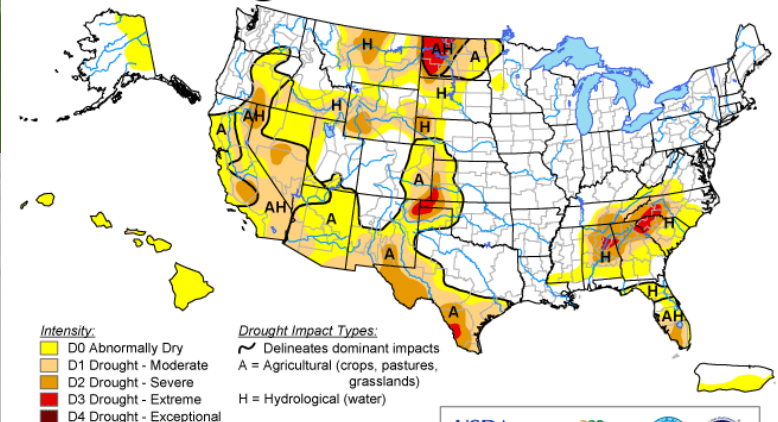


Montana Hydrology Conference  
Great Falls, Montana  
May 27-28 2008

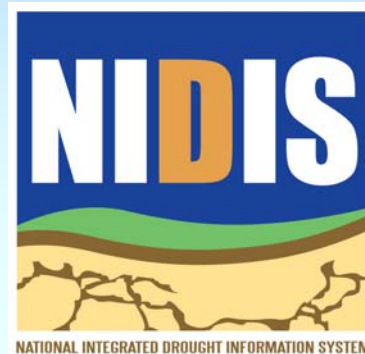


## **U.S. Drought Monitor**

May 20, 2008  
Valid 8 a.m. EDT



# National Integrated Drought Information System: U.S. Drought Portal



**Timothy W. Owen<sup>1</sup>, Mark Svoboda<sup>2</sup>, Roger Pulwarty<sup>3</sup>,  
Brian Fuchs<sup>2</sup>**

1. NOAA's National Climatic Data Center
2. National Drought Mitigation Center
3. NOAA's Climate Program Office

Montana Hydrology Conference  
May 28, 2008  
Great Falls, Montana

# So...What is Drought?

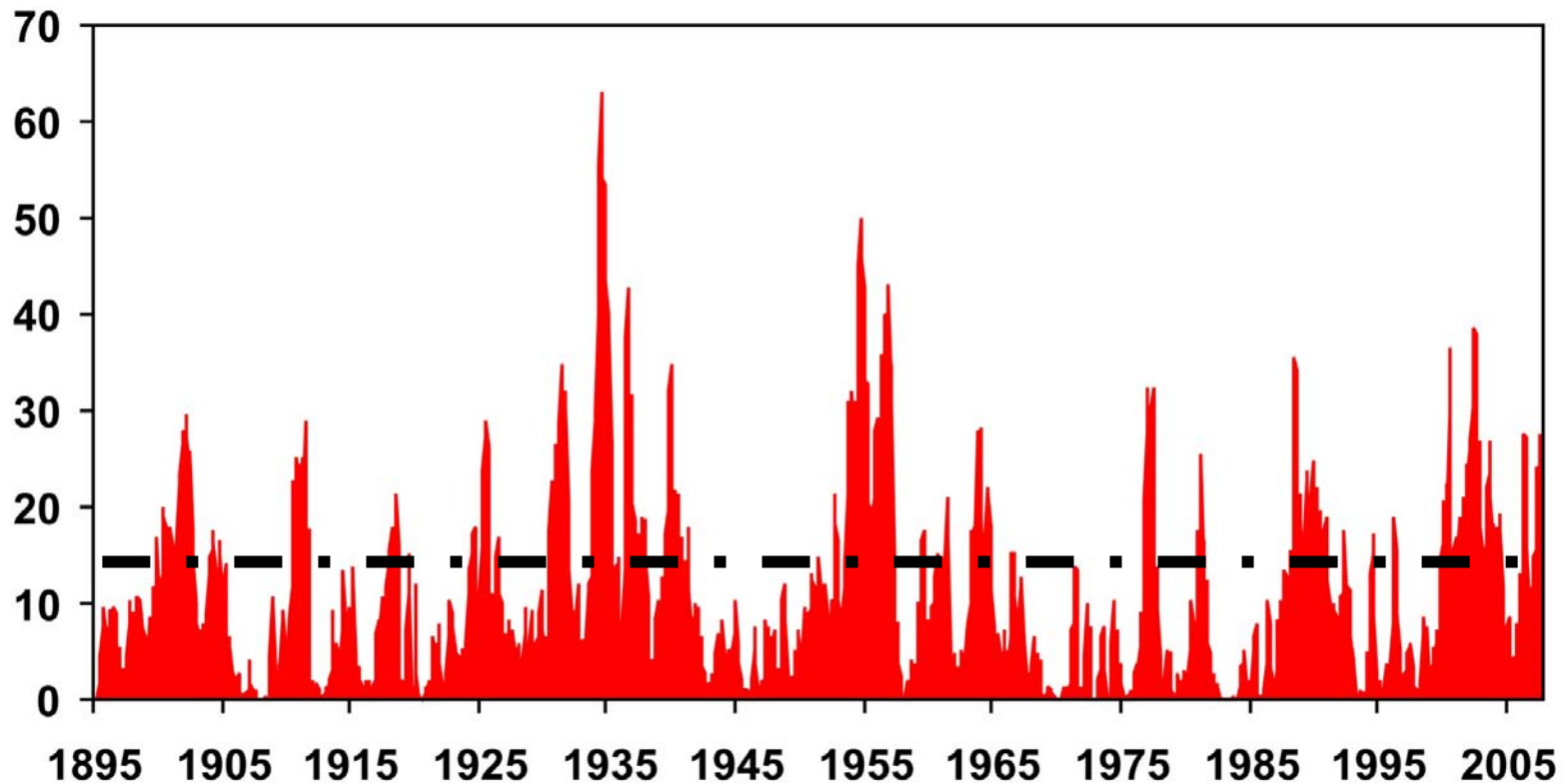
“Drought is a **persistent** and **abnormal** moisture deficiency having **adverse impacts** on vegetation, animals, or people.”

- *National Drought Policy Commission Report, May 2000*



# Percent Area of the United States in Severe and Extreme Drought

January 1895–November 2007

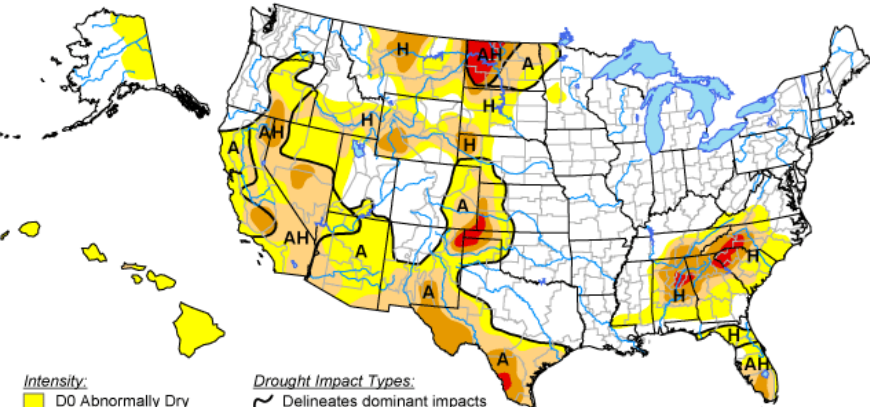


Based on data from the National Climatic Data Center/NOAA



# U.S. Drought Monitor

May 20, 2008  
Valid 8 a.m. EDT



## Intensity:

D0 Abnormally Dry  
D1 Drought - Moderate  
D2 Drought - Severe  
D3 Drought - Extreme  
D4 Drought - Exceptional

## Drought Impact Types:

~ Delineates dominant impacts  
A = Agricultural (crops, pastures, grasslands)  
H = Hydrological (water)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://drought.unl.edu/dm>

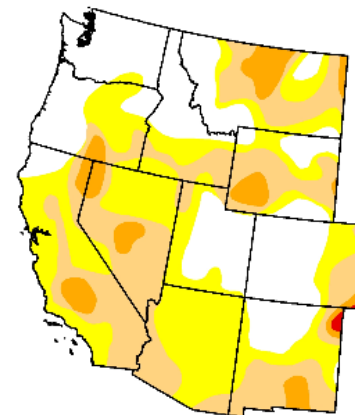
# U.S. Drought Monitor West

May 20, 2008  
Valid 7 a.m. EST

	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	32.8	67.2	34.5	6.8	0.2	0.0
Last Week (05/13/2008 map)	33.4	66.6	35.8	6.2	0.0	0.0
3 Months Ago (02/26/2008 map)	37.8	62.2	37.0	16.6	0.0	0.0
Start of Calendar Year (01/01/2008 map)	26.3	73.7	54.7	33.1	2.7	0.0
Start of Water Year (10/02/2007 map)	22.0	78.0	62.3	44.7	12.4	0.0
One Year Ago (05/22/2007 map)	30.9	69.1	51.2	24.4	7.5	0.0

## Intensity:

D0 Abnormally Dry  
D1 Drought - Moderate  
D2 Drought - Severe  
D3 Drought - Extreme  
D4 Drought - Exceptional



# U.S. Drought Monitor Montana

May 20, 2008  
Valid 7 a.m. EST

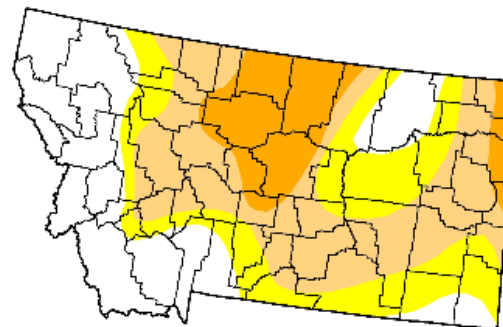
	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	31.0	69.0	45.7	14.7	0.0	0.0
Last Week (05/13/2008 map)	25.3	74.7	54.9	14.7	0.0	0.0
3 Months Ago (02/26/2008 map)	21.8	78.2	51.0	9.0	0.0	0.0
Start of Calendar Year (01/01/2008 map)	0.8	99.2	61.2	26.4	0.0	0.0
Start of Water Year (10/02/2007 map)	3.9	96.1	88.3	46.2	9.5	0.0
One Year Ago (05/22/2007 map)	54.2	45.8	17.4	0.0	0.0	0.0

## Intensity:

D0 Abnormally Dry  
D1 Drought - Moderate  
D2 Drought - Severe  
D3 Drought - Extreme  
D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements

<http://drought.unl.edu/dm>



Released Thursday, May 22, 2008  
Author: David Miskus, JAWF/CPC/NOAA



Released Thursday, May 22, 2008  
Author: David Miskus, JAWF/CPC/NOAA



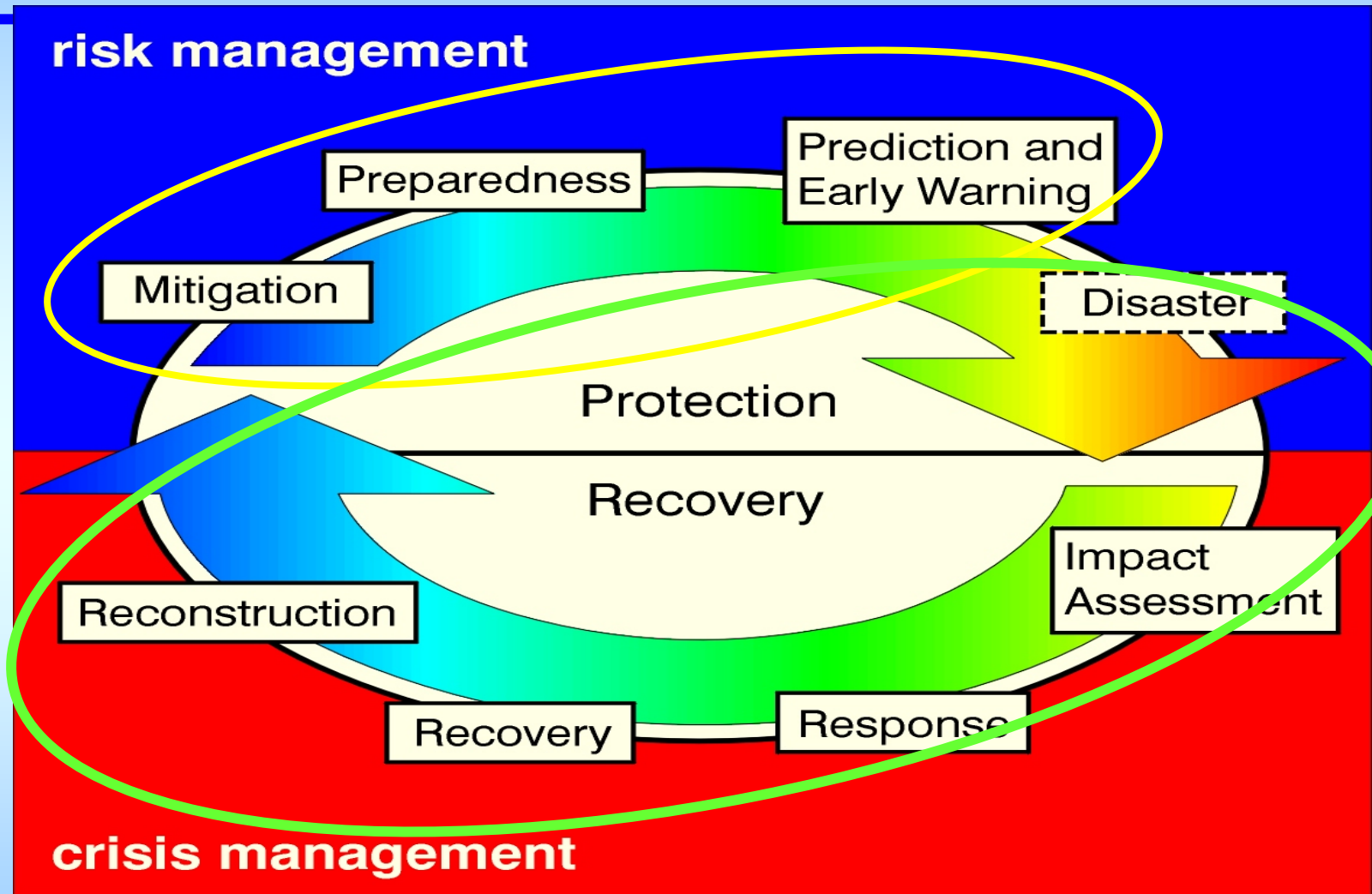
# Why the Recent Interest in Drought in the U.S.?

---

- Single and multi-year severe droughts
  - impressive intensity and duration
  - impacting both western and eastern U.S.
- Spatial extent—40 to 60% of U.S.
- Complexity of impacts → Vulnerability
  - Agriculture, energy, transportation, urban water supply, recreation/tourism, fires, environmental, social
  - Conflicts between water users
  - Water restrictions (agricultural and urban)
- Costly→Since 1980, \$175 Billion in costs associated with drought and heat waves (FEMA)
- Media coverage (extremes)



# The Cycle of Disaster Management



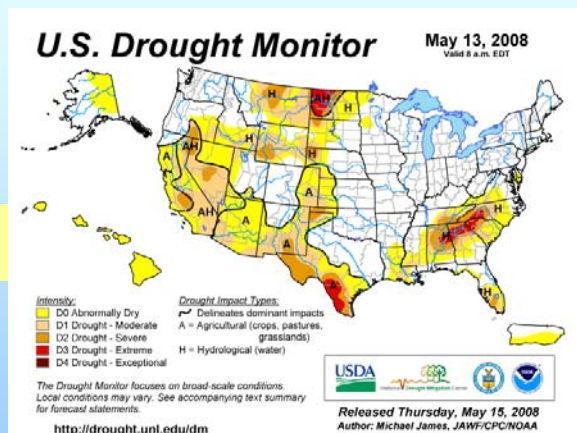
# What is NIDIS?

*A National Integrated Drought Information System (NIDIS)*

## National Integrated Drought Information System

**NIDIS:** An integrated, **interagency** national drought monitoring and forecasting system that provides:

- An **early warning & forecast system** for drought.
- Drought impact and causation **education**.
- Information for drought **planning and mitigation**.
- An interactive, web-based **drought portal**.
- Improved **observational** capabilities.

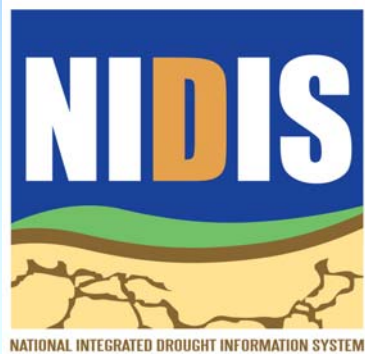


***NIDIS Builds Upon Collaborative Successes!***



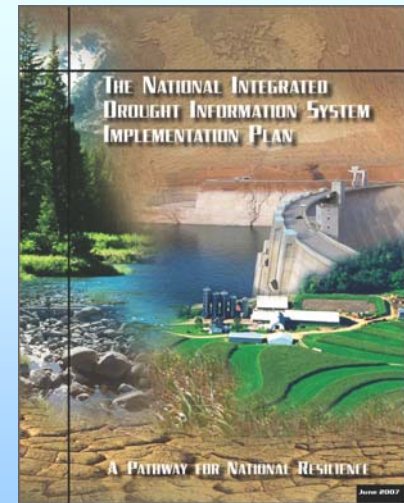
# NIDIS Vision and Implementation Plan

## *A Pathway to Operationalization*



A dynamic and accessible drought risk information system that provides users with the ability to determine the potential impacts of drought, and the decision support tools needed to better prepare for and mitigate the effects of drought.

The NIDIS Implementation Plan (June 2007) calls for the establishment of a U.S. Drought Portal (drought.gov) is a key component to realizing this vision.



May 28, 2008

Great Falls, Montana



# NIDIS Interagency Partners

## *Federal Level*

**U.S. Department of Agriculture (USDA):** Agricultural Research Service, Cooperative State Research, Education, Farm Service Agency, Forest Service, National Agricultural Statistics Service, Natural Resources Conservation Service, Risk Management Agency

**U.S. Department of Commerce (DoC):** International Trade Administration, National Oceanic and Atmospheric Administration

**U.S. Department of Energy (DoE):** Office of Electricity Delivery and Energy Reliability, Office of Energy Efficiency & Renewable Energy, Office of Science

**U.S. Department of Homeland Security (DHS):** Federal Emergency Management (FEMA) Directorate

**U.S. Department of the Interior (DoI):** Bureau of Indian Affairs, Bureau of Land Management, Bureau of Reclamation, National Park Service, U.S. Fish and Wildlife Service, U.S. Geological Survey,

**U.S. Department of Transportation (DoT):** Federal Aviation Administration, Federal Highway Administration, Surface Transportation Board

**Environmental Protection Agency (EPA)**

**Farm Credit Administration (FCA)**

**Federal Energy Regulatory Commission (FERC)**

**Internal Revenue Services**

**International Trade Commission (USITC)**

**National Aeronautics and Space Administration (NASA)**

**National Science Foundation (NSF)**

**Small Business Administration (SBA)**



# NIDIS Interagency Partners

## *Regional, State, Tribal, and Local Levels*

**Western Governors' Association** – a key sponsor of early NIDIS development efforts and ongoing concerns representing drought in the Western States;

**Western States Water Council** – represents water managers in the Western United States;

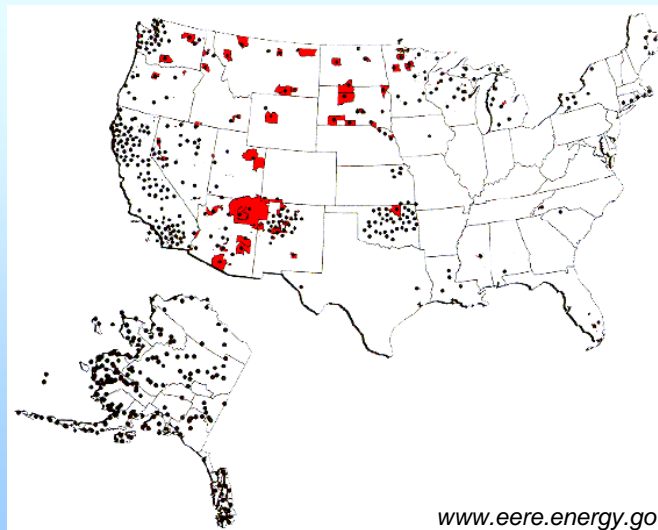
**National Conference of State Legislatures** – drought monitoring and mitigation activities will require state support, much of which require state legislative involvement

**National League of Cities** – water availability and quality issues

**American Association of State Climatologists** – an organization state-appointed individuals, many of whom are active participants in the Drought Monitor or serve on drought monitoring committees within their respective states. Most are housed at universities and also conduct applied climate research;

**National Drought Mitigation Center** – A national clearinghouse for drought-related information, research, mitigation measures, and operational home of the Drought Monitor;

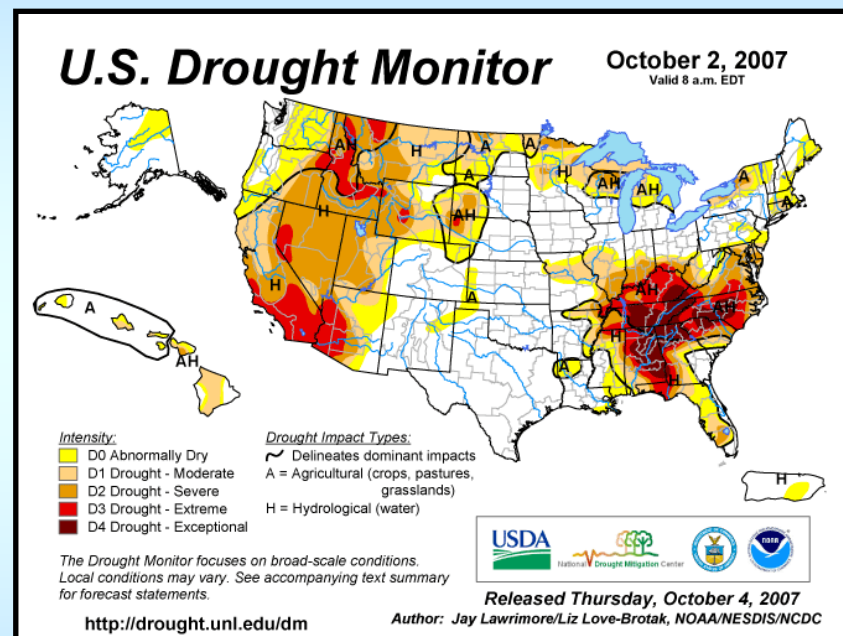
**Native American tribal governments** – mostly located in arid regions in which water is a vital concern:



[www.eere.energy.gov](http://www.eere.energy.gov)

# Drought Early Warning System

- The U.S. proposes the development of a Drought Early Warning System that will:
  - provide accurate, timely, and integrated information on drought conditions and associated risks at relevant spatial scales to facilitate proactive decisions
  - present needed information for drought response, planning, mitigation, and recovery
  - support the capability to provide data and information required for local, regional, and national decisions on drought
  - aid local, regional, and national decisions regarding human and environmental health & welfare during drought



## U.S. Drought Monitor



# Drought Early Warning System Benefits

## Preparedness: Historical information used to minimize drought related risk (examples)

- Allow planners and policy makers to develop optimal procedures and associated actions from drought impacts

## Response: Drought occurs somewhere on the planet every year & can persist for years.

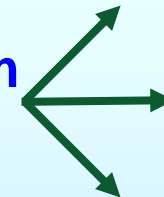
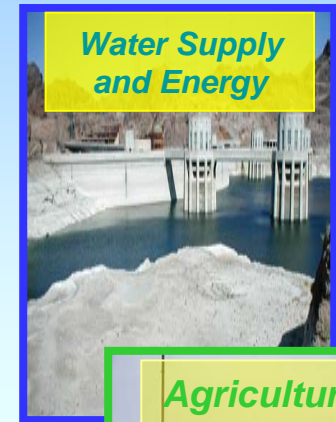
- System will provide the quantitative information necessary for timely and measured response

## Mitigation: A myriad of problems stem from drought. (examples)

- Water supply, water quality, agriculture, energy production, fire, human health, etc.
- Information for planning mitigations supported by a comprehensive analysis of drought severity

## Recovery: Critical drought information

- Enables countries to access more comprehensive tools and observations for emergency managers and planners



# U.S. Drought Portal Home Page

Showcase Portlets and Key Themes

<http://drought.gov>

NIDIS Public Community - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.drought.gov/portal/server.pt

NIDIS National Integrated Drought Information System drought.gov

Portal Home | Log In | Contact Us | Text-Only Search: [ ]

### Navigate drought.gov

- What is NIDIS?
- Current Drought
- Forecasting
- Impacts
- Planning
- Education
- Research

### Area Information

Select State... >> Go

Select Region... >> Go

### Maps & Tools

>> GIS Resources

### Welcome to drought.gov!

Where are Drought Conditions Now? How is the Drought Affecting Me? Will the Drought Continue?

### U.S. Drought Monitor

May 13, 2008  
Vicki Keith, PhD

Legend:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

Released Thursday, May 15, 2008  
Author: Michael Justice, JMW@PCN/DMA

### Drought Conditions

% Area for U.S., including, AK, HI & PR  
(As of 5.13.2008)

Info Source: National Drought Mitigation Center

Legend:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

View Time Series - Last 12 months

### What's New

- [\\*\\* drought.gov - New Release! \\*\\*](#)
- [Remote Sensing Workshop](#)
- [Southeast Drought Workshop](#)
- [Status of Drought Early Warning Workshop - June 2008](#)

### Drought in the News

- [WATER SUPPLY ISSUES PROJECTED TO BE A GROWING CONCERN IN U.S.](#)
- [Georgia Wetlands Offer Cure for Drought : NPR](#)
- [Los Angeles Times: Water shortage worst in decades, official says](#)
- [Learning from our arid past - Los Angeles Times](#)
- [NOAA - National Oceanic and Atmospheric Administration - NOAA Employing New Tools to Accurately Measure Climate Change](#)


### NIDIS Feature

#### Southeast Drought Workshop

April 29-30, 2008

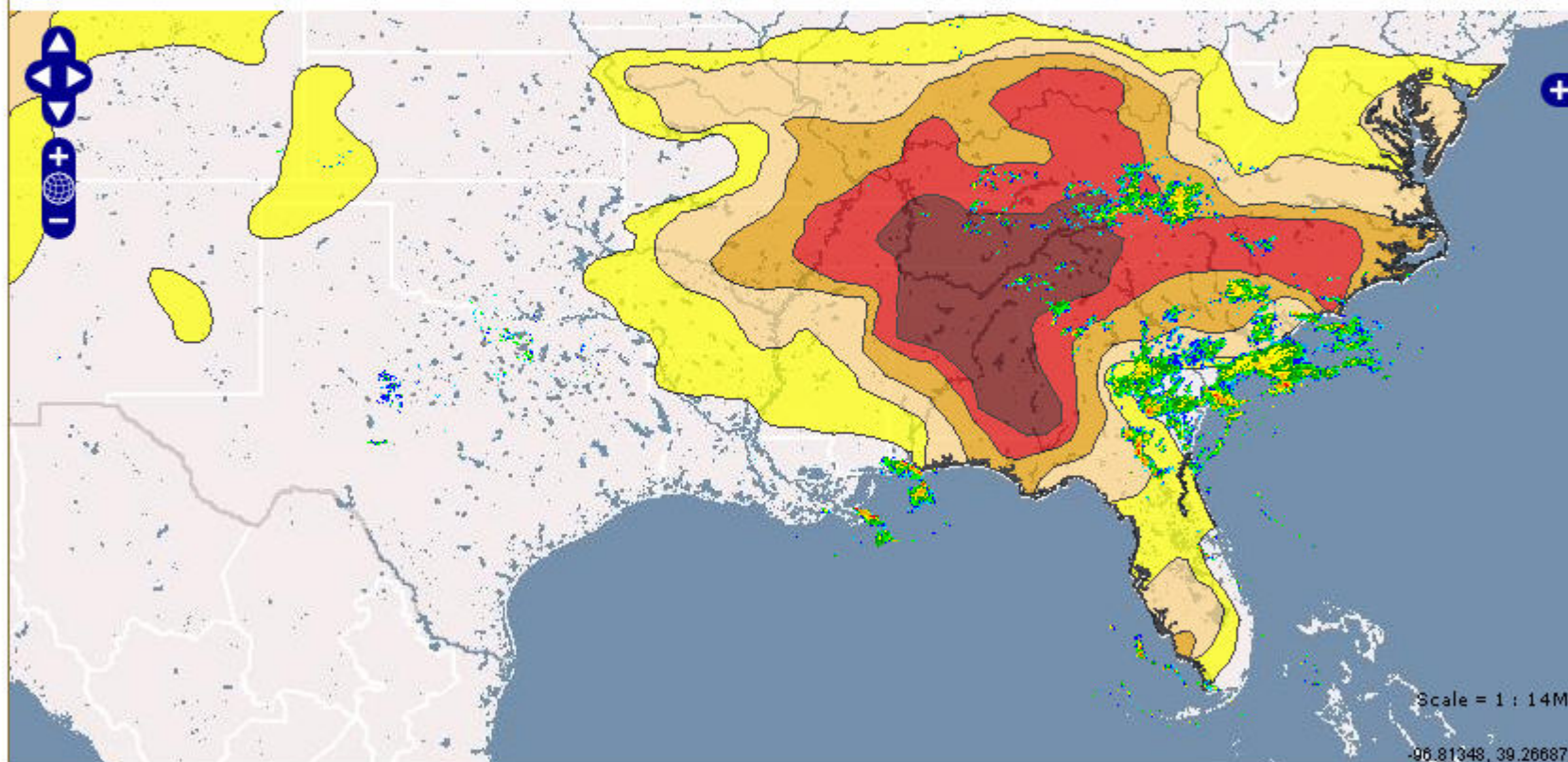
[view details >>](#)



This USD P Map Viewer displays the 45 Minute NEXRAD Precipitation Radar. Use the  below to switch between available layers including divisional drought, precipitation and temperature data.

View Divisional Data Layers By:

State



Hide/Display Legend

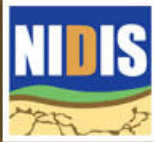
Hide/Display Opacity Controls

NIDIS Corn Opacity: << 0.3 >>

NIDIS Poultry/Hogs Opacity: << 0.3 >>

USD M Opacity: << 0.7 >>






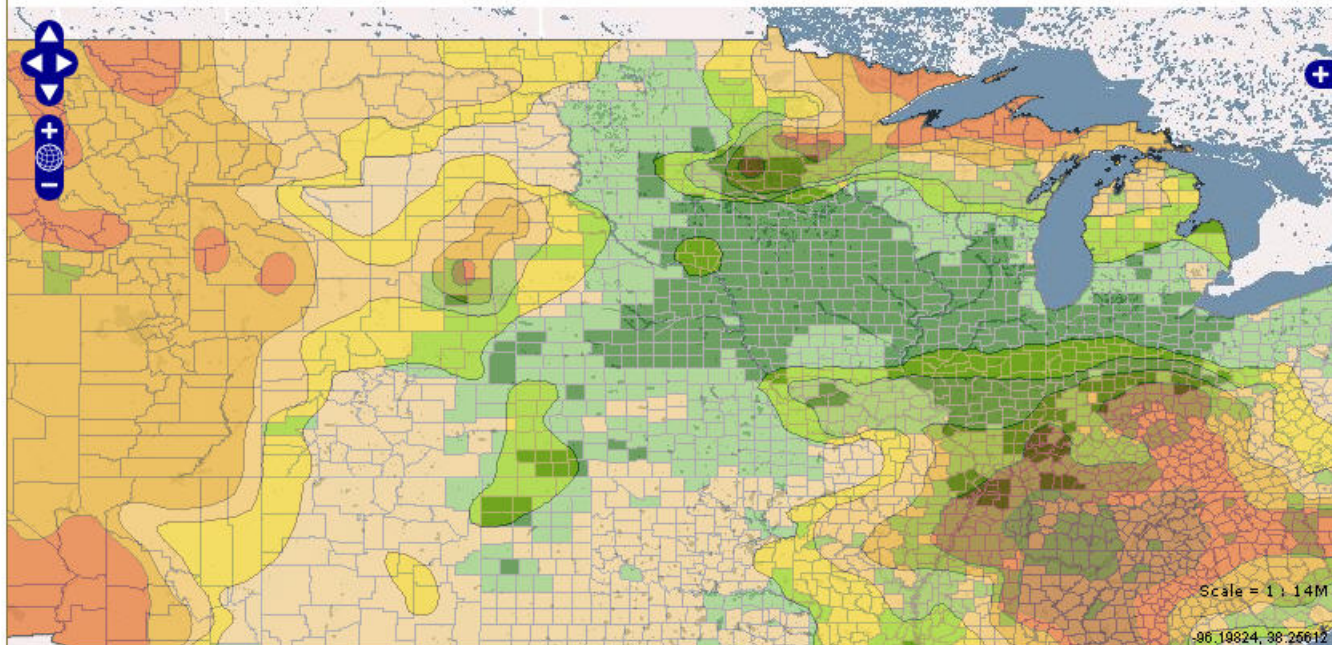
## USDP Map Viewer



National Climatic Data Center (NCDC)   
NOAA Satellites and Information

This USDP Map Viewer displays the 45 Minute NEXRAD Precipitation Radar. Use the  below to switch between available layers including divisional drought, precipitation and temperature data.

View Divisional Data Layers By:



Hide/Display Legend

Hide/Display Opacity Controls

NIDIS Corn Opacity: <<  >> NIDIS Poultry/Hogs Opacity: <<  >> USDM Opacity: <<  >>


(For more advanced GIS features, visit NCDC's GIS Portal)



## USDP Map Viewer

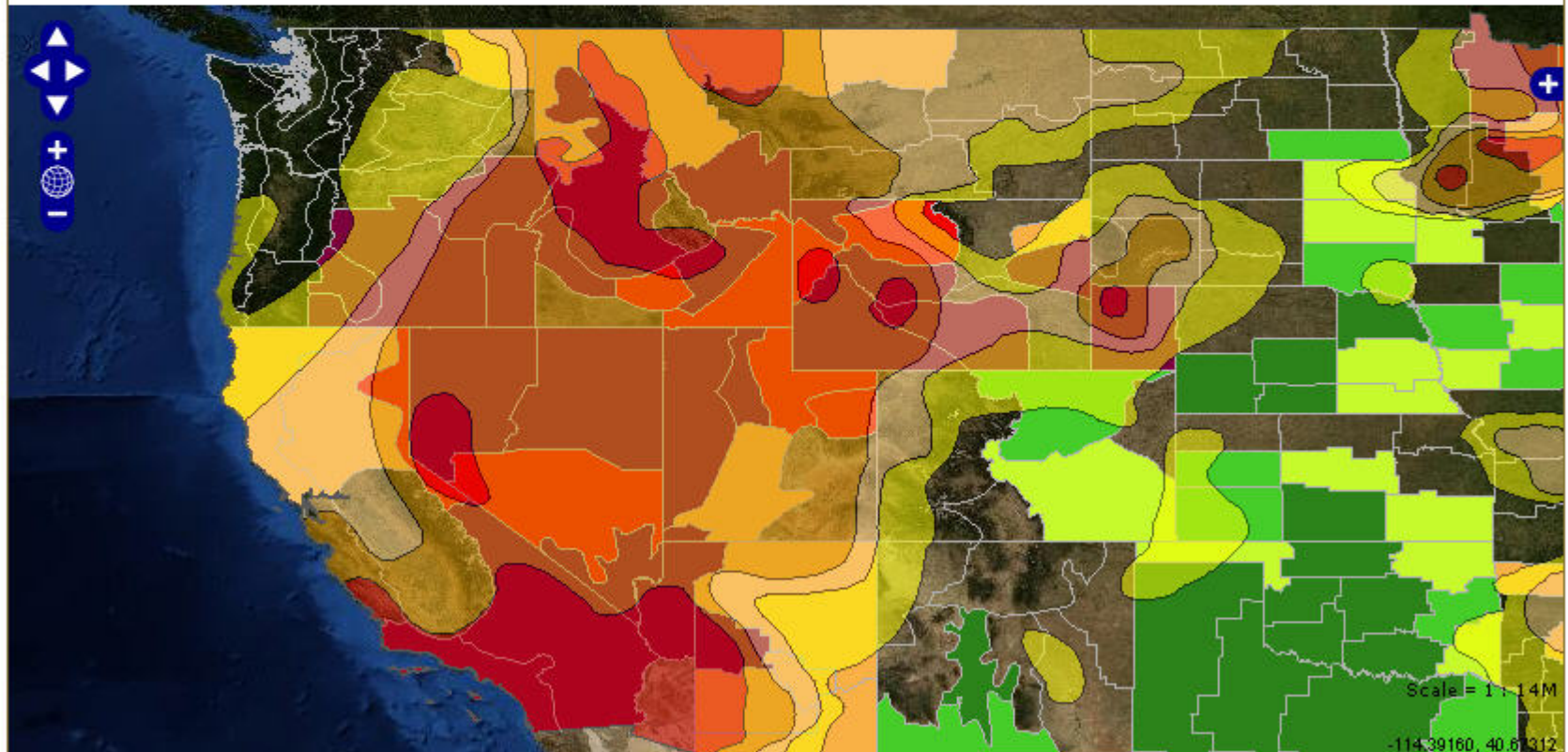


National Climatic Data Center (NCDC)   
NOAA Satellites and Information

This USDP Map Viewer displays the 45 Minute NEXRAD Precipitation Radar. Use the  below to switch between available layers including divisional drought, precipitation and temperature data.

View Divisional Data Layers By:

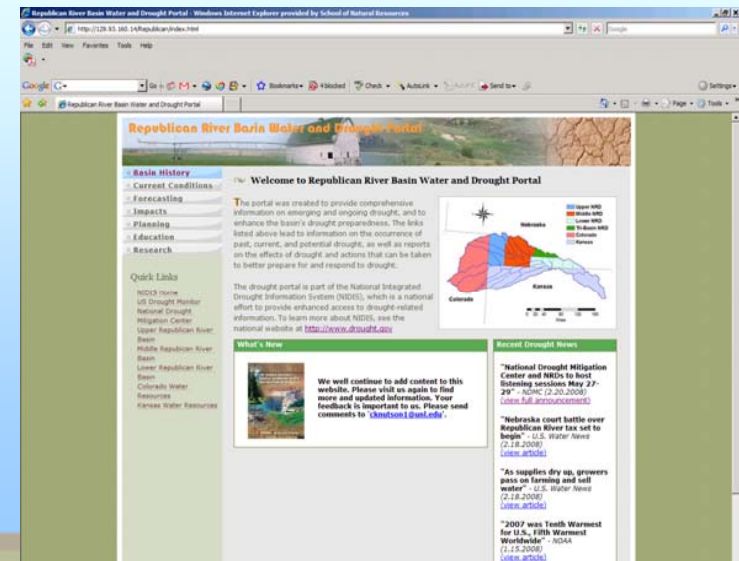
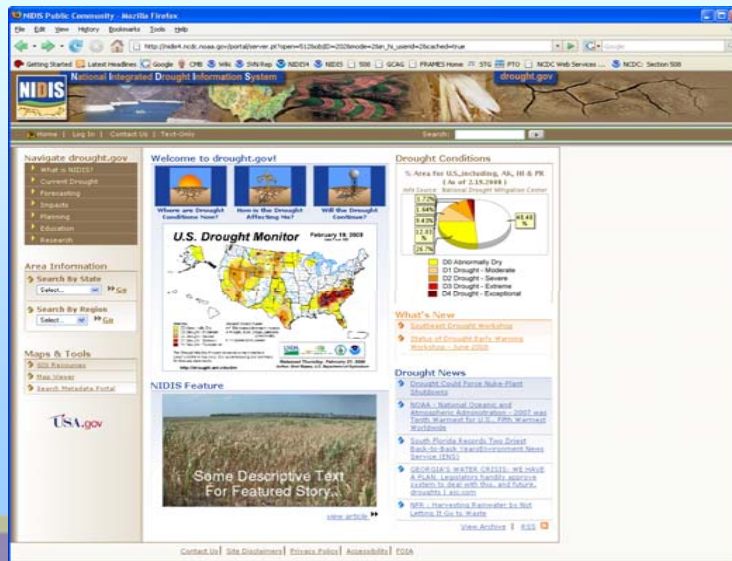
Climate Division 



Hide/Display Legend

# Future Work: Phase 2 and Beyond...

- Enhanced content and linkages
- GIS capabilities
- Community collaboration tools and features
- Links to emerging early warning networks and products (SM, satellite, etc.)
- Link to Local or Basin-Level drought portals
- Potential for data and information/management sharing cross-agency and at all levels



# Summary

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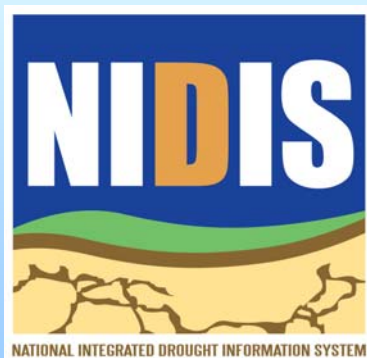
## **NIDIS' U.S. Drought Portal Provides a Window for Interagency Data Collaboration and Dissemination**

- The initial phase of the USDP (November 2007) will allow drought experts and general users to answer key questions about drought on an end-to-end basis.

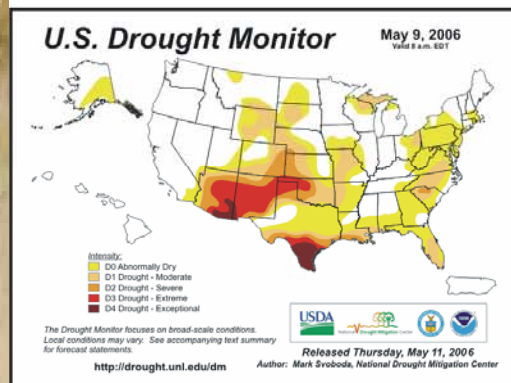
## **A drought early warning system needs to get down to the local level:**

- preparedness, response, mitigation, and recovery from drought that affect such societal issues as water management, agriculture, human health, energy, and many others

## **A Republican Basin Drought Portal will be one of the first basin (local) portals designed and built to be integrated with the national NIDIS Portal!**

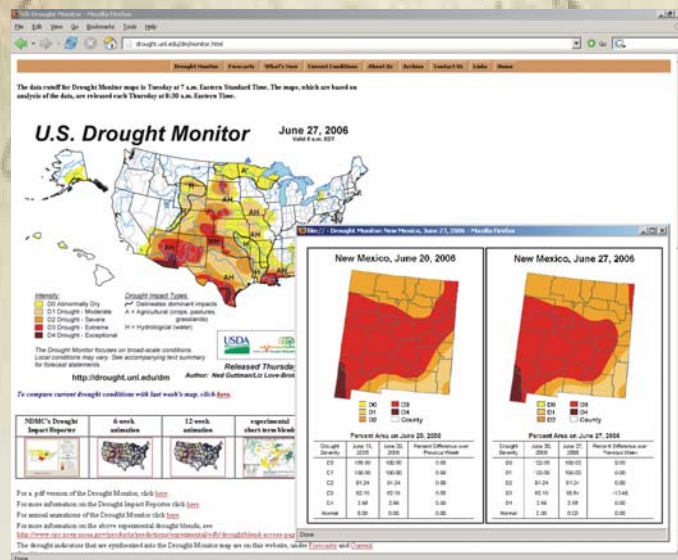




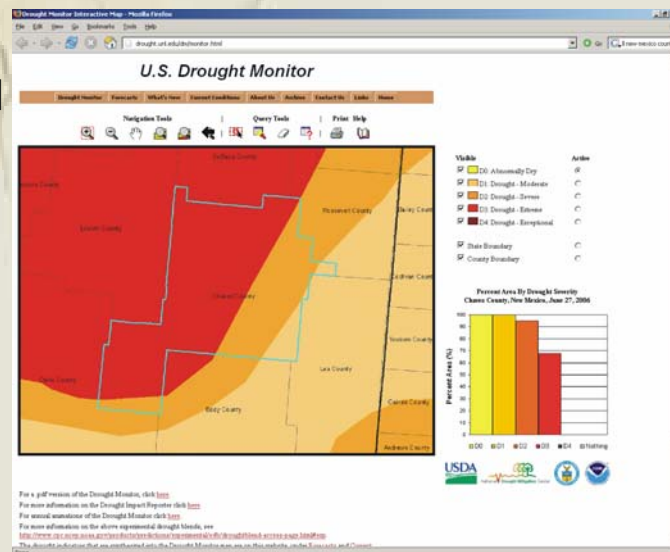


# Drought Monitor Decision Support System (DM-DSS): A Web-based Assessment Tool for Decision Makers

Mark Svoboda, Brian Fuchs, Dr. Michael Hayes, Dr. Jae Ryu, Soren Scott, and Ian Cottingham



Moving toward state-level trend analysis capabilities (left) and providing more county-level drought assessment information (right).



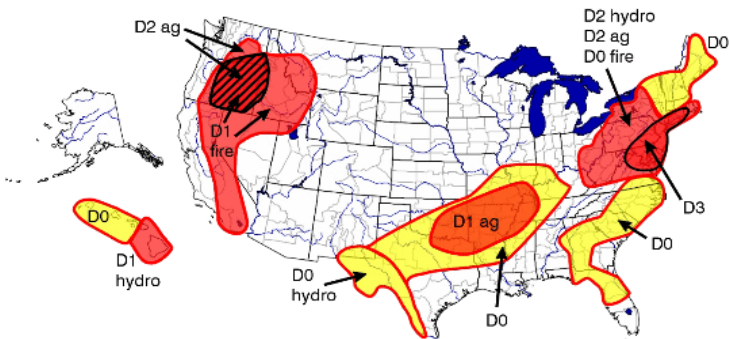


# The U.S. Drought Monitor

***Since 1999, NOAA (CPC and NCDC), USDA, and the NDMC have produced a weekly composite drought map -- the U.S. Drought Monitor -- with input from numerous federal and non-federal partners***

August 3, 1999

## Experimental U.S. Drought Monitor



"Drought" means moisture shortages leading to damaged crops or pastures, high wildfire risk, or water shortages. The map is based on information from many sources, including both satellite and surface data, and it focuses on widespread drought. Local conditions may vary.

**Yellow** (D0) = Drought Watch Area (abnormally dry but not full drought status)

**Red** (D1-D4) = Current drought ranging in severity from standard (D1) to severe (D2-D3) to extreme (D4)

Crosshatching (X) = Overlapping drought type areas

Drought type: Used when impacts differ

Ag = agricultural (crops, grasslands)

Fire = forestry (wildfire potential)

Hydro = hydrological (rivers, wells, reservoirs)

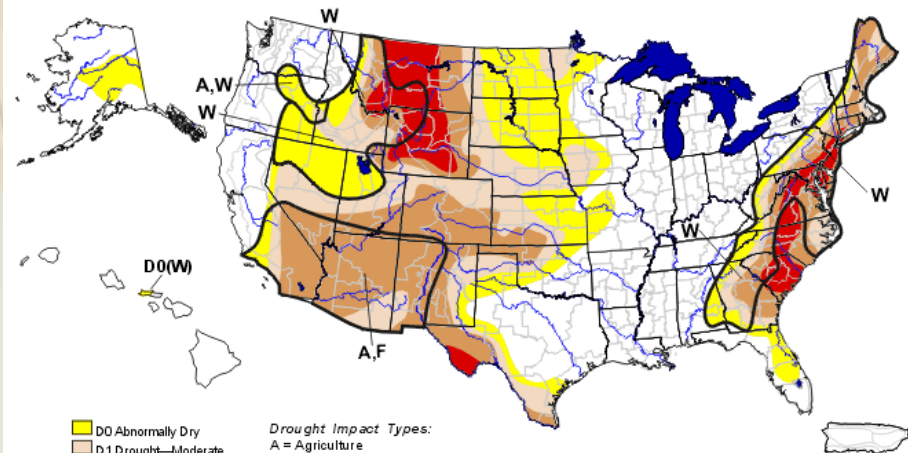
Plus (+) = Forecast to intensify

Minus (-) = Forecast to diminish



## U.S. Drought Monitor April 16, 2002

Valid 8 a.m. EDT



- D0 Abnormally Dry
- D1 Drought—Moderate
- D2 Drought—Severe
- D3 Drought—Extreme
- D4 Drought—Exceptional

Drought Impact Types:

A = Agriculture

W = Water (Hydrological)

F = Fire danger (Wildfires)

— Delineates dominant impacts

(No type = All 3 impacts)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecasts statements.

<http://drought.unl.edu/dm>

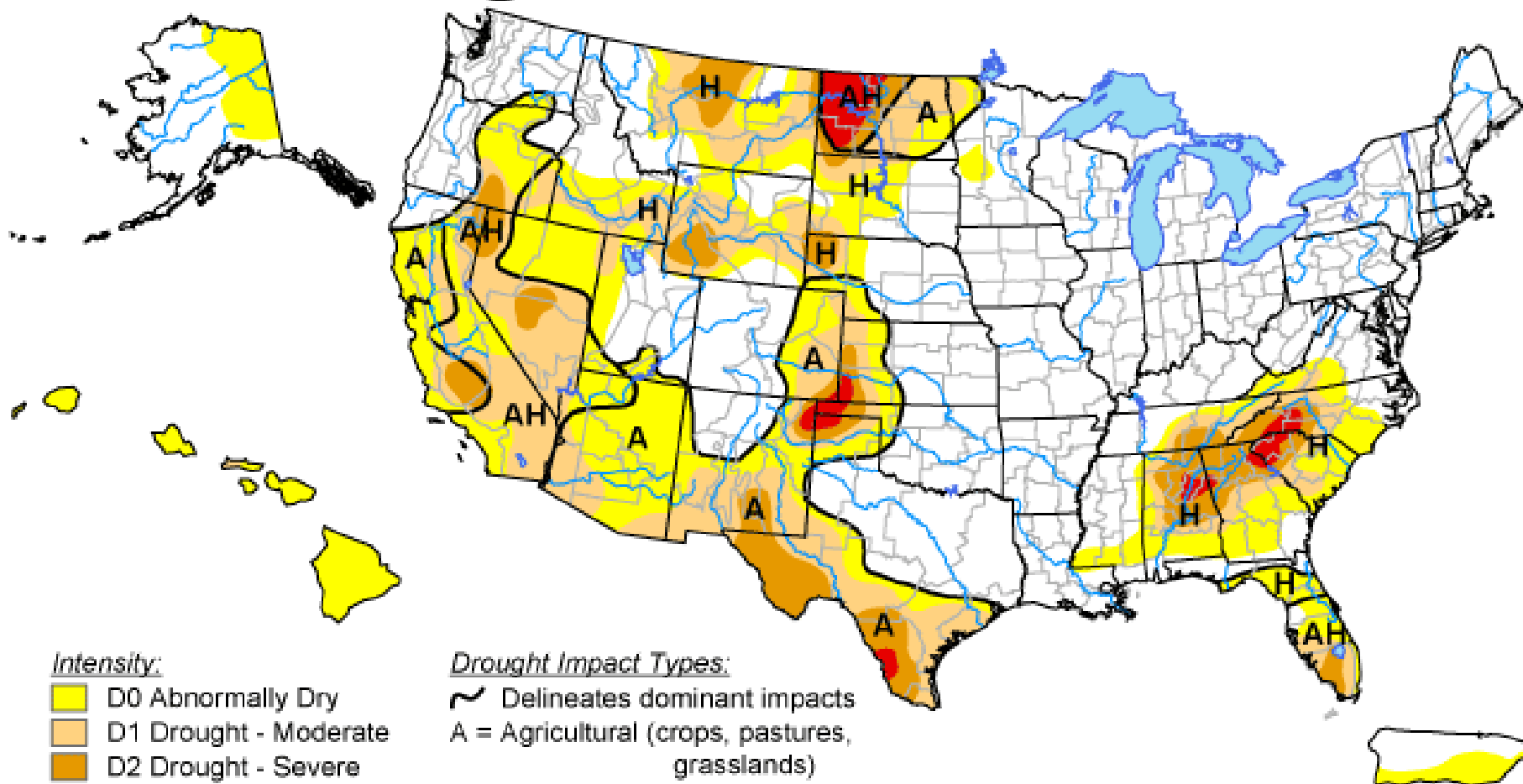


Released Thursday, April 18, 2002

Author: David Miskus, JAW/CPC/NOAA

# U.S. Drought Monitor

May 20, 2008  
Valid 8 a.m. EDT



## Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

## Drought Impact Types:

- Delineates dominant impacts
- A** = Agricultural (crops, pastures, grasslands)
- H** = Hydrological (water)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://drought.unl.edu/dm>



Released Thursday, May 22, 2008

Author: David Miskus, JAWF/CPC/NOAA

# The Drought Monitor Concept

- A **partnership** between the NDMC, USDA and NOAA's CPC and NCDC (**authors**)
- Incorporate relevant information and products from all entities (and levels of government) dealing with drought (RCC's, SC's, federal/state agencies, etc.) (**experts**)
- The **Drought Monitor** is **updated weekly** and provides a general up-to-date summary of current drought conditions across the 50 states, Puerto Rico and the Pacific possessions

# Recent Drought Losses in the United States

**1988:** \$39.2 billion nationwide

**1993:** \$1 billion across the Southeast

**1996:** \$10 billion across the Southwest

**1998:** \$6-8 billion across the South

**1999:** \$1.2 billion along the East Coast

**2000:** \$4.8 billion across the Plains and South

**2002:** >\$11.4 billion across 30 states

**2006:** >\$6.2 billion across the U.S.

**2007:** >\$5.0 billion across Southeast and Plains

**Average annual losses: \$6-8 billion (FEMA)**



# Original Objectives



- “Fujita-like” scale
- Assessment of current conditions
- **NOT** a forecast!
- **NOT** a drought declaration!
- Identify impacts (A, H)
- Incorporate local expert input
- Be as objective as possible

# U.S. Drought Monitor

## Integrates Key Drought Indicators:

- Palmer Drought Index
- SPI
- KBDI
- Modeled Soil Moisture
- 7-Day Avg. Streamflow
- Precipitation Anomalies

## Growing Season:

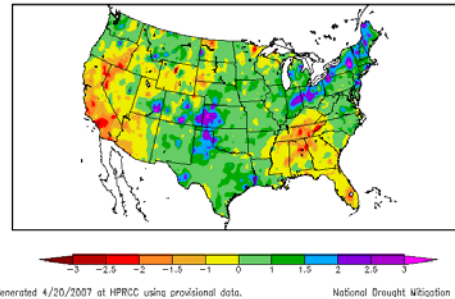
- Crop Moisture Index
- Sat. Veg. Health Index
- Soil Moisture
- Mesonet data

## In The West:

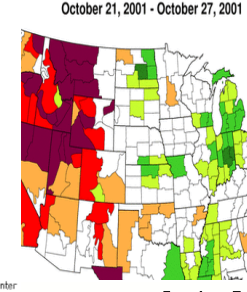
- SWSI
- Reservoir levels
- Snowpack
- Streamflow

Created in ArcGIS

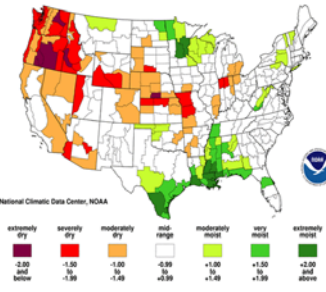
Water Year SPI  
10/1/2006 - 4/19/2007



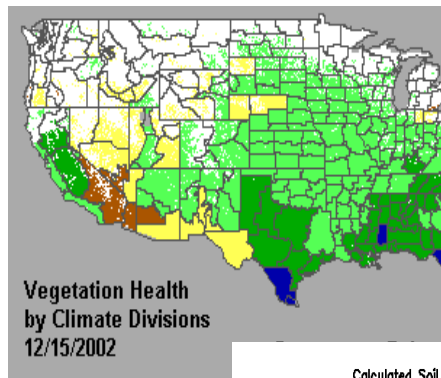
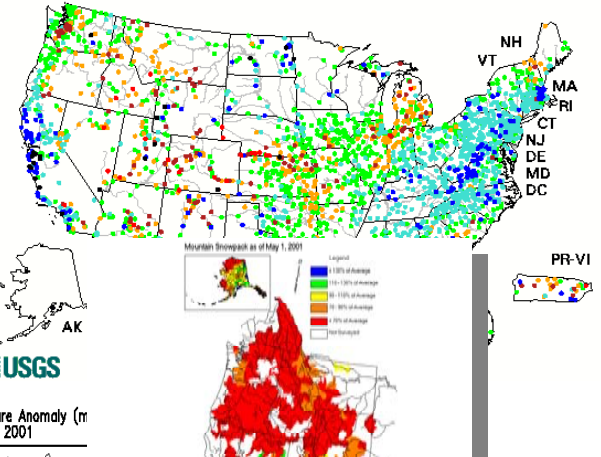
Palmer Drought Index  
Long-Term (Meteorological) Conditions  
October 21, 2001 - October 27, 2001



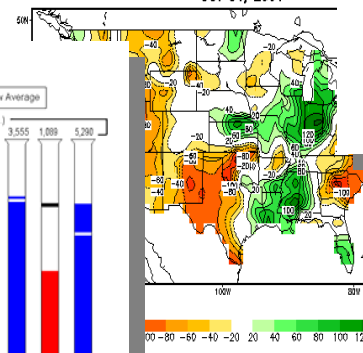
Standardized Precipitation Index  
Six Months  
June-November 2002



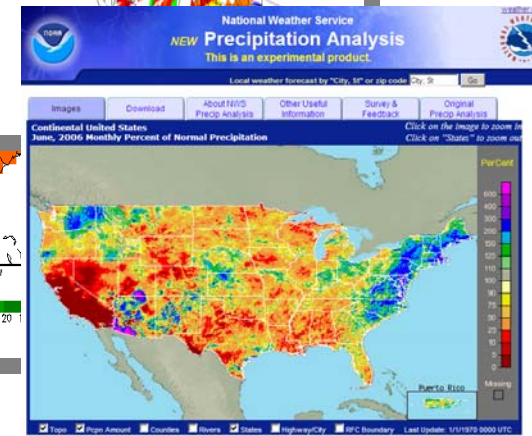
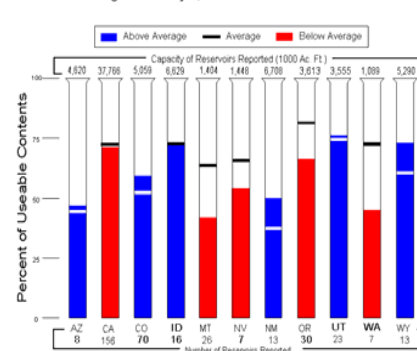
Sunday, December 22, 2002



Calculated Soil Moisture Anomaly (mm)  
OCT 31, 2001

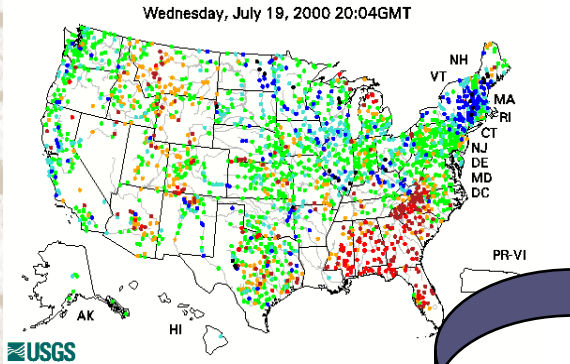


Reservoir Storage as of May 1, 2001

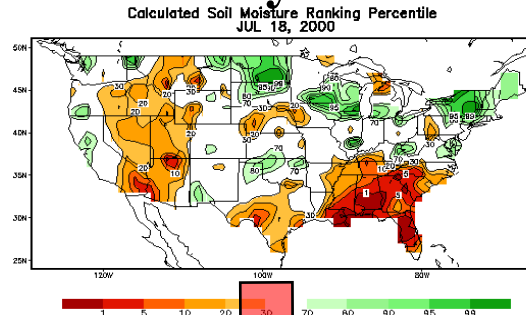


# Principal Drought Monitor Inputs

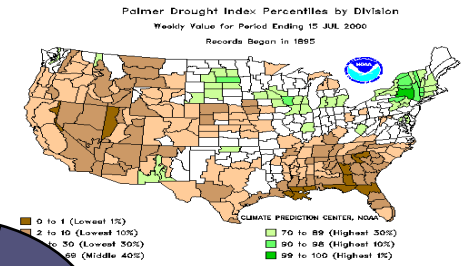
## USGS Streamflow



## CPC Daily Soil Model

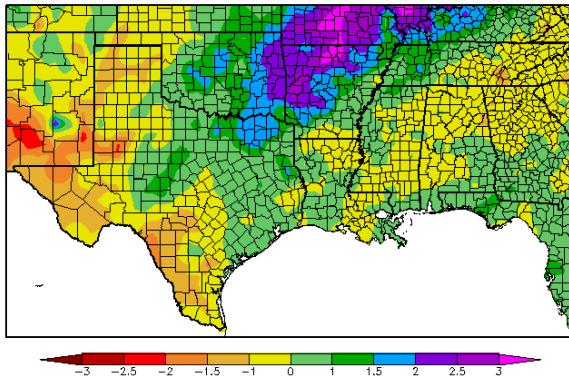


## Palmer Drought Index



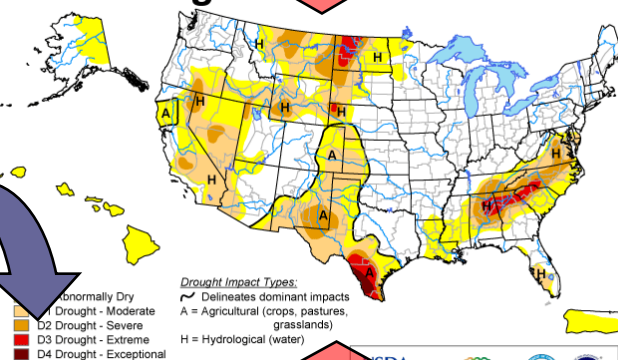
## SPI Drought Index

90 Day SPI  
1/16/2008 - 4/14/2008



## U.S. Drought Monitor

April 15, 2008  
Valid 8 a.m. EDT

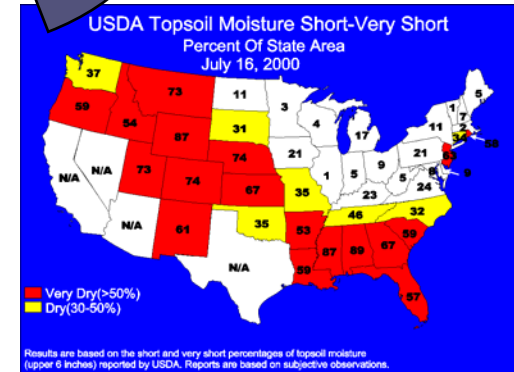


The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

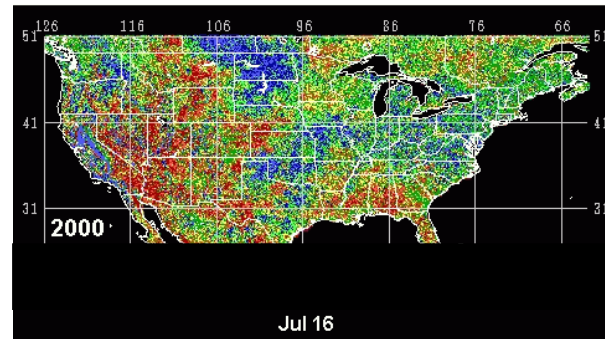
<http://drought.unl.edu/dm>

Released Thursday, April 17, 2008  
Authors: Jay Lawrence/Liz Love-Brotak, NOAA/NESDIS/NCDC

## USDA Soil Ratings



Results are based on the short and very short percentages of topsoil moisture (upper 6 inches) reported by USDA. Reports are based on subjective observations.



## Satellite Veg Health



# ***Drought Monitor Development*** (Period starts 12Z last Tuesday)



## **Monday** (5 Days available)

- ✓ Draft map sent to local experts

## **Tuesday** (6 Days available)

- ✓ Local expert feedback
- ✓ Draft map sent to local experts
- ✓ Draft text sent to local experts

## **Wednesday** (7 Days available; ending 12Z yesterday)

- 
- ✓ Local expert feedback
  - ✓ Draft map(s) sent to local experts
  - ✓ Draft text(s) sent to local experts (Outlook)
  - ✓ Final map and text sent to secured ftp server
- 

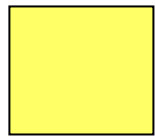
## **Thursday**

- ✓ Final map & text released on NDMC Website



# ***U.S. Drought Monitor Map***

## ***Drought Intensity Categories***



D0 **Abnormally Dry** (30%tile)



D1 Drought – **Moderate** (20%tile)



D2 Drought – **Severe** (10%tile)



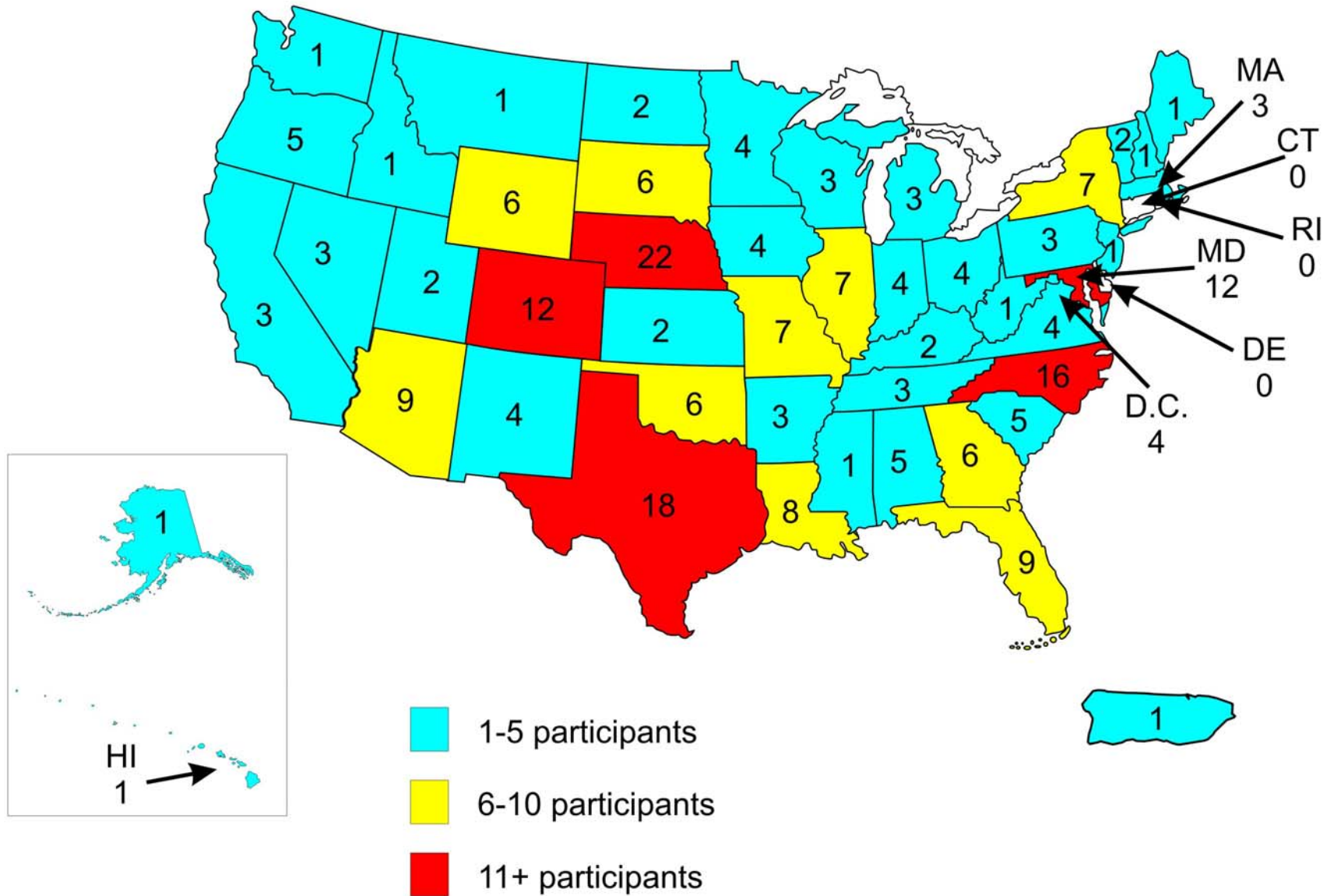
D3 Drought – **Extreme** (5%tile)



D4 Drought – **Exceptional** (2%tile)

# USDM Listserve Participants

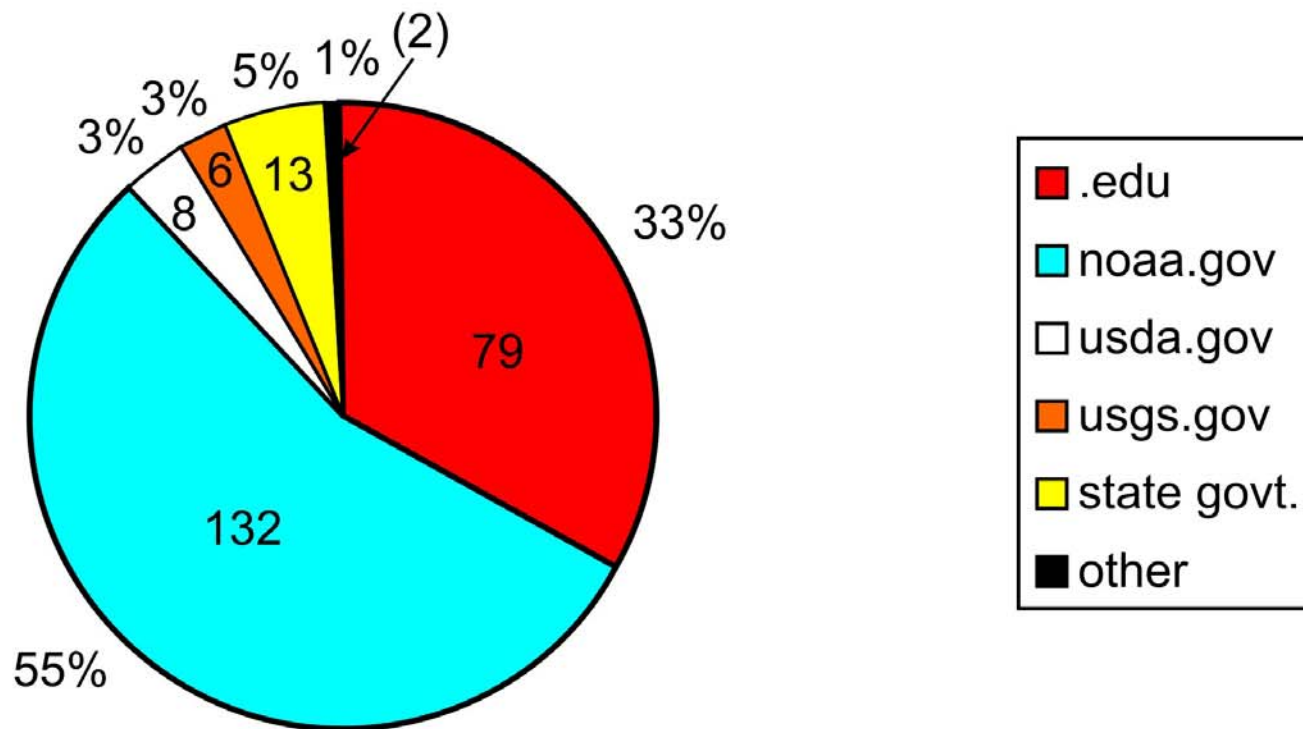
(as of January 24, 2007)



**Total: 240**

# USDM Listserve Participants

(as of January 24, 2007)



Visit the [NDMC Photo Gallery](#) to see photos of drought conditions in [California](#), [Georgia](#), [South Carolina](#), and other states. If you have photos showing drought conditions, please consider [submitting](#) them to the Photo Gallery.

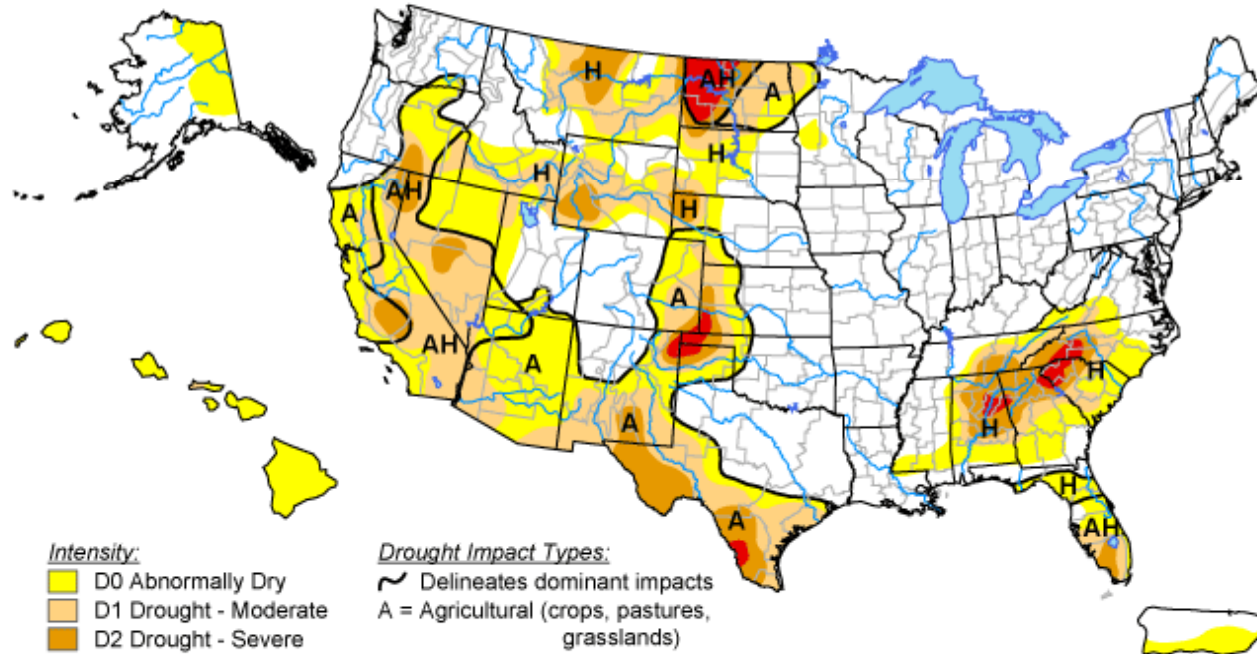
The data cutoff for Drought Monitor maps is Tuesday at 7 a.m. Eastern Standard Time. The maps, which are based on analysis of the data, are released each Thursday at 8:30 a.m. Eastern Time.

**NOTE: To view regional drought conditions, click on map below. State maps can be accessed from regional maps.**

# U.S. Drought Monitor

May 20, 2008

Valid 8 a.m. EDT



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://drought.unl.edu/dm>



Released Thursday, May 22, 2008

Author: David Miskus, JAWF/CPC/NOAA



# U.S. Drought Monitor

## West

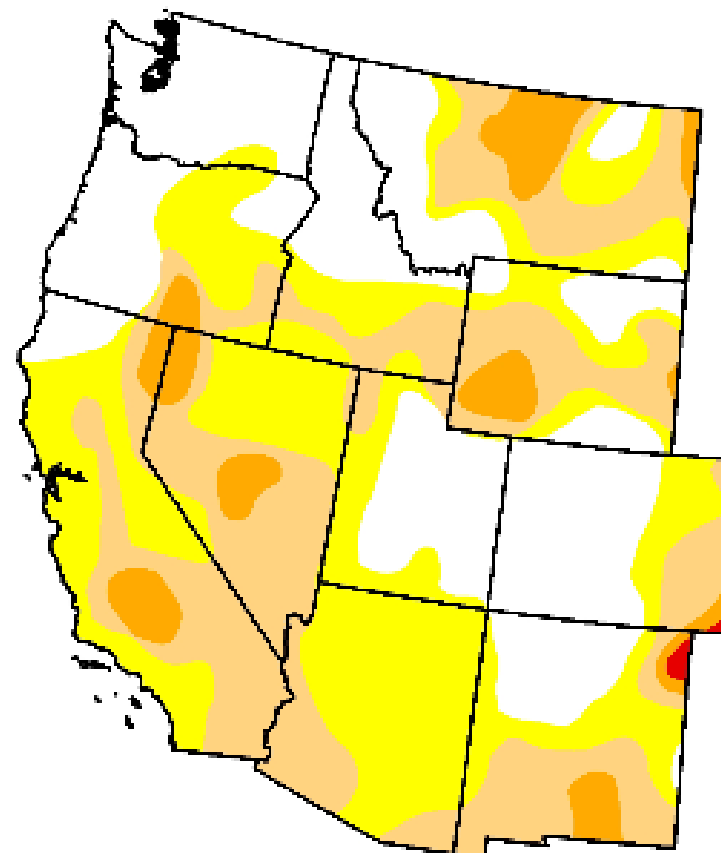
May 20, 2008

Valid 7 a.m. EST

*Drought Conditions (Percent Area)*

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	32.8	67.2	34.5	6.8	0.2	0.0
Last Week (05/13/2008 map)	33.4	66.6	35.8	6.2	0.0	0.0
3 Months Ago (02/26/2008 map)	37.8	62.2	37.0	16.6	0.0	0.0
Start of Calendar Year (01/01/2008 map)	26.3	73.7	54.7	33.1	2.7	0.0
Start of Water Year (10/02/2007 map)	22.0	78.0	62.3	44.7	12.4	0.0
One Year Ago (05/22/2007 map)	30.9	69.1	51.2	24.4	7.5	0.0

Intensity:



*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements*

<http://drought.unl.edu/dm>



**Released Thursday, May 22, 2008**

**Author: David Miskus, JAWF/CPC/NOAA**

# U.S. Drought Monitor

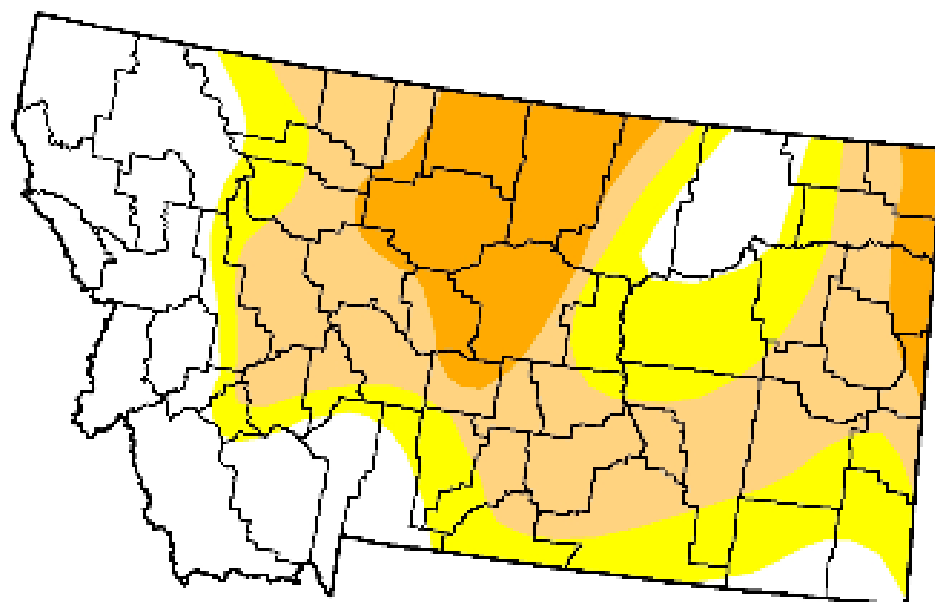
## Montana

May 20, 2008

Valid 7 a.m. EST

*Drought Conditions (Percent Area)*

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	31.0	69.0	45.7	14.7	0.0	0.0
Last Week (05/13/2008 map)	25.3	74.7	54.9	14.7	0.0	0.0
3 Months Ago (02/26/2008 map)	21.8	78.2	51.0	9.0	0.0	0.0
Start of Calendar Year (01/01/2008 map)	0.8	99.2	61.2	26.4	0.0	0.0
Start of Water Year (10/02/2007 map)	3.9	96.1	88.3	46.2	9.5	0.0
One Year Ago (05/22/2007 map)	54.2	45.8	17.4	0.0	0.0	0.0



Intensity:



*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements*

<http://drought.unl.edu/dm>



**Released Thursday, May 22, 2008**

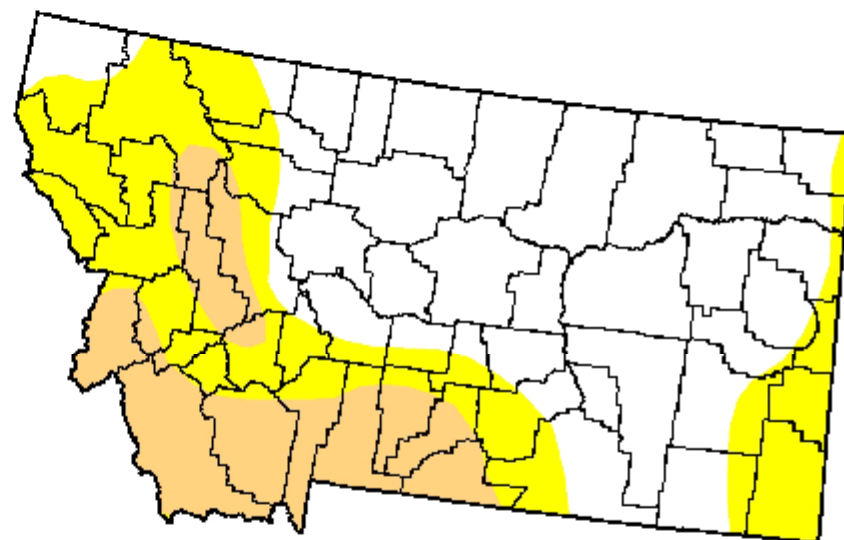
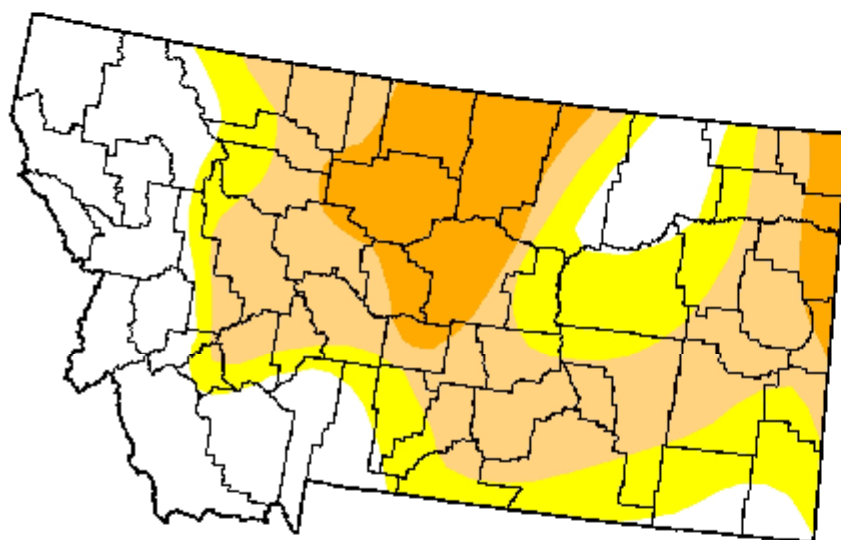
**Author: David Miskus, JAWF/CPC/NOAA**

## Drought Severity

☐ D0 Abnormally Dry 
 ☐ D1 Drought - Moderate 
 ☐ D2 Drought - Severe 
 ☐ D3 Drought - Extreme 
 ☐ D4 Drought - Exceptional

May 20, 2008

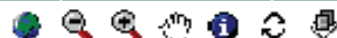
May 22, 2007



Download [image](#) or [PDF](#)  
 Read the [summary](#)

Download [image](#) or [PDF](#)  
 Read the [summary](#)

Week	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
05/20/08	31.03	68.97	45.68	14.69	0.01	0.00
05/22/07	54.20	45.80	17.39	0.00	0.00	0.00



?

## Legend

Visible

### ☐ Drought Monitor



Date

September 18, 2007

Transparency

60%

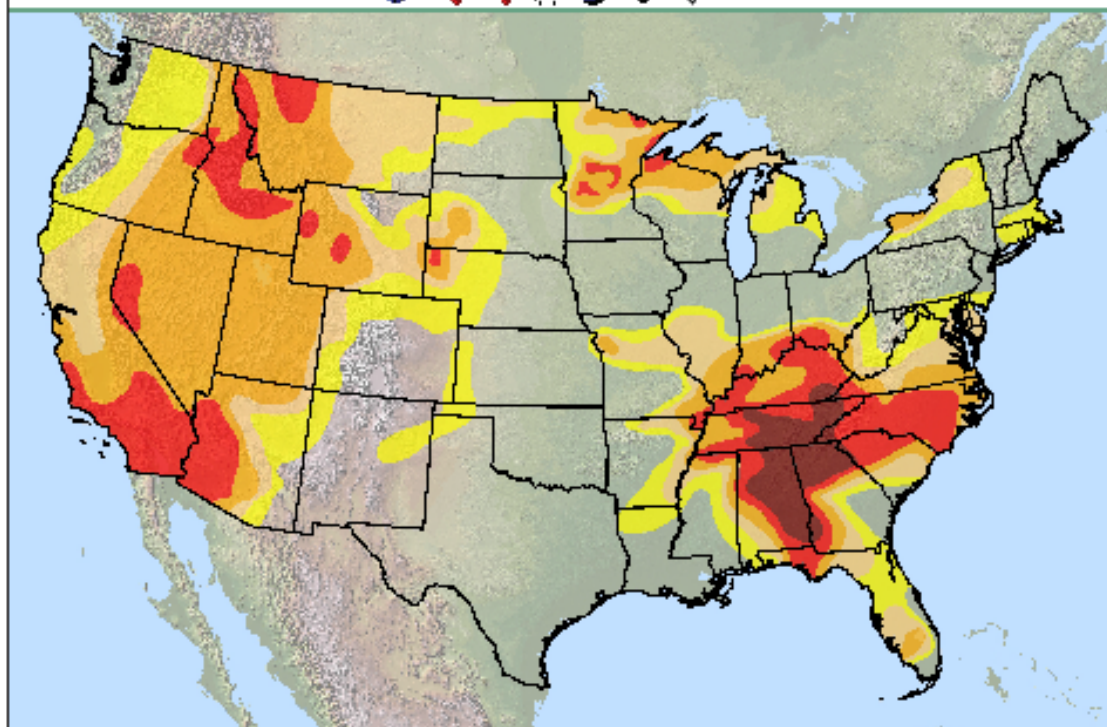
### ☐ ACIS Stations

### ☐ Climate Layers

- ☐ Standardized Precipitation Index
- ☐ Palmer Drought Severity Index
- ☐ ACIS Precipitation/Temperature Overlay
- ☐ NWS Hybrid Radar/Gauge Precipitation Analysis

### ☐ Boundaries

- ☐ Rivers
- ☐ Hydrologic Units (HUCs)
- ☐ Congressional Districts
- ☐ Climate Divisions
- ☐ Counties
- ☐ Cities
- ☐ Roads
- ☐ County Warning Areas
- ☐ States



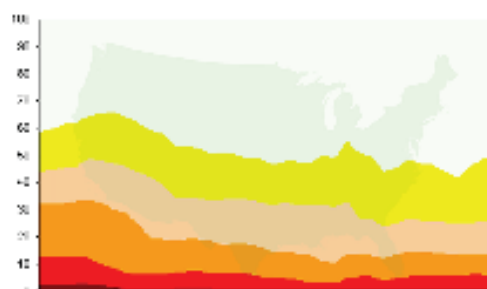
☒ Continental United States

☐ Alaska

☐ Hawaii

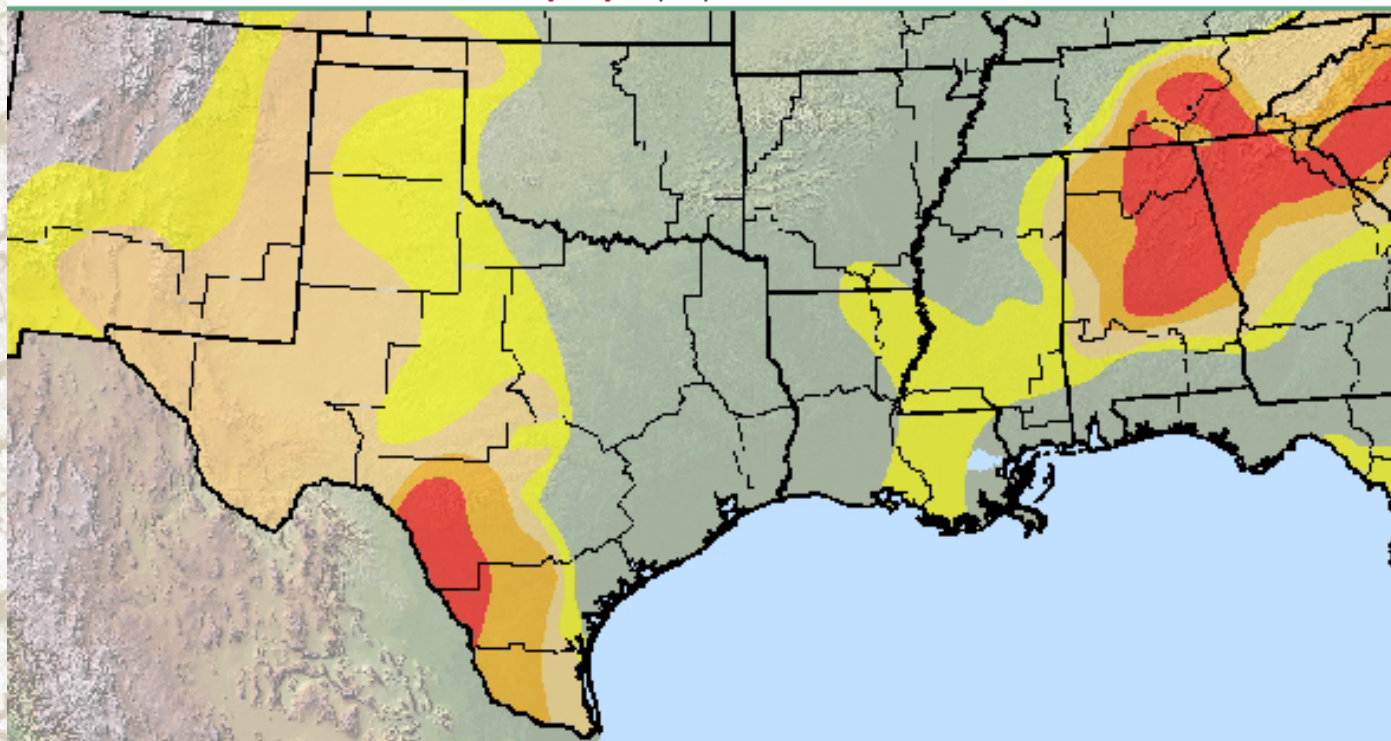
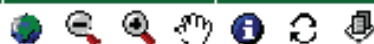
☐ Puerto Rico

## Drought Conditions: 2007



Date	D0	D1	D2	D3	D4
May 10, 2007	41.4	58.5	41.7	32.0	1.2
May 17, 2007	40.4	58.5	44.4	32.1	1.2
May 24, 2007	30.40	51.62	47.47	32.33	2.4
May 31, 2007	30.07	51.84	47.21	32.1	2.37
Jun 7, 2007	35.36	54.6	47.24	32.79	2.07
Jun 14, 2007	31.79	52.21	46.17	32.85	1.01
Jun 21, 2007	33.84	52.17	46.25	30.01	1.52
Jun 28, 2007	32.55	54.05	45.11	28.74	1.55
Jul 5, 2007	37.53	52.47	47.24	28.83	0.4
Jul 12, 2007	31.15	52.15	47.11	19.21	1.1
Jul 19, 2007	31.25	52.15	47.24	19.4	1.51
Jul 26, 2007	48.77	52.83	47.54	18.32	1.77
Aug 2, 2007	46.43	52.68	47.24	19.08	1.92
Aug 9, 2007	47.47	52.66	47.24	19.05	1.92
Aug 16, 2007	49.43	52.66	47.24	19.05	1.92




☒ Continental United States

☐ Alaska

☐ Hawaii

☐ Puerto Rico

## Legend

Visible

☐ Drought Monitor

- ☐ D0
- ☐ D1
- ☐ D2
- ☐ D3
- ☐ D4

Date

April 01, 2008

Transparency

40%

☐ ACIS Stations

☐ Climate Layers

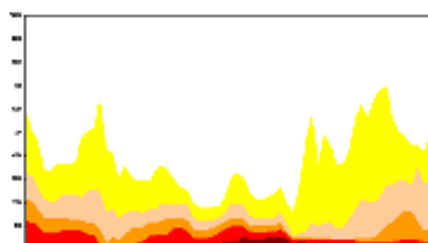
- ☐ Standardized Precipitation Index
- ☐ Palmer Drought Severity Index

Select

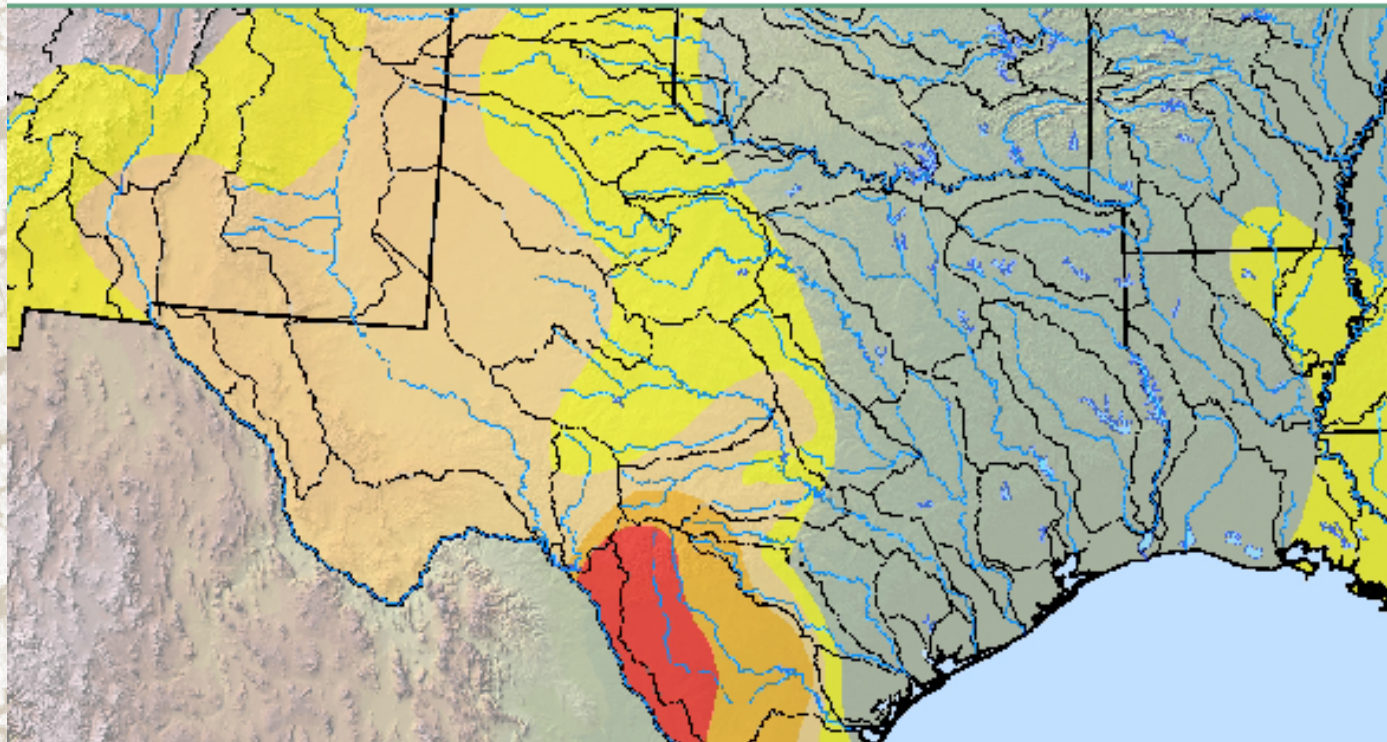
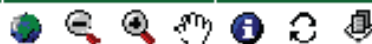
☐ Boundaries

- ☐ Rivers
- ☐ Hydrologic Units (HUCs)
- ☐ Congressional Districts
- ☐ Climate Divisions
- ☐ Counties
- ☐ Cities
- ☐ Roads
- ☐ County Warning Areas
- ☐ States

## Drought Conditions: January 2007-April 2008



Week	Nothing	D0	D1	D2	D3	D4
April 1, 2008	51.02	48.99	28.51	8.13	3.17	0.00
March 25, 2008	58.11	41.89	28.71	8.13	3.51	0.00
March 18, 2008	55.69	44.31	35.53	11.78	3.90	0.49
March 11, 2008	55.63	44.57	28.85	16.16	3.90	1.28
March 4, 2008	51.03	48.37	28.68	16.72	3.06	1.34
February 26, 2008	49.91	50.09	29.50	14.11	3.79	1.37
February 19, 2008	43.93	56.07	27.82	11.83	3.63	1.49
February 12, 2008	30.16	69.84	27.53	10.42	2.92	1.50
February 5, 2008	31.89	68.11	21.94	7.40	2.90	1.50
January 29, 2008	35.34	64.66	20.55	5.20	3.19	1.44
January 22, 2008	43.28	56.72	20.47	4.59	3.10	1.43



☒ Continental United States

☐ Alaska

☐ Hawaii

☐ Puerto Rico

## Climate Links for Texas

Southern Regional Climate Center:  
<http://www.srcc.lsu.edu>

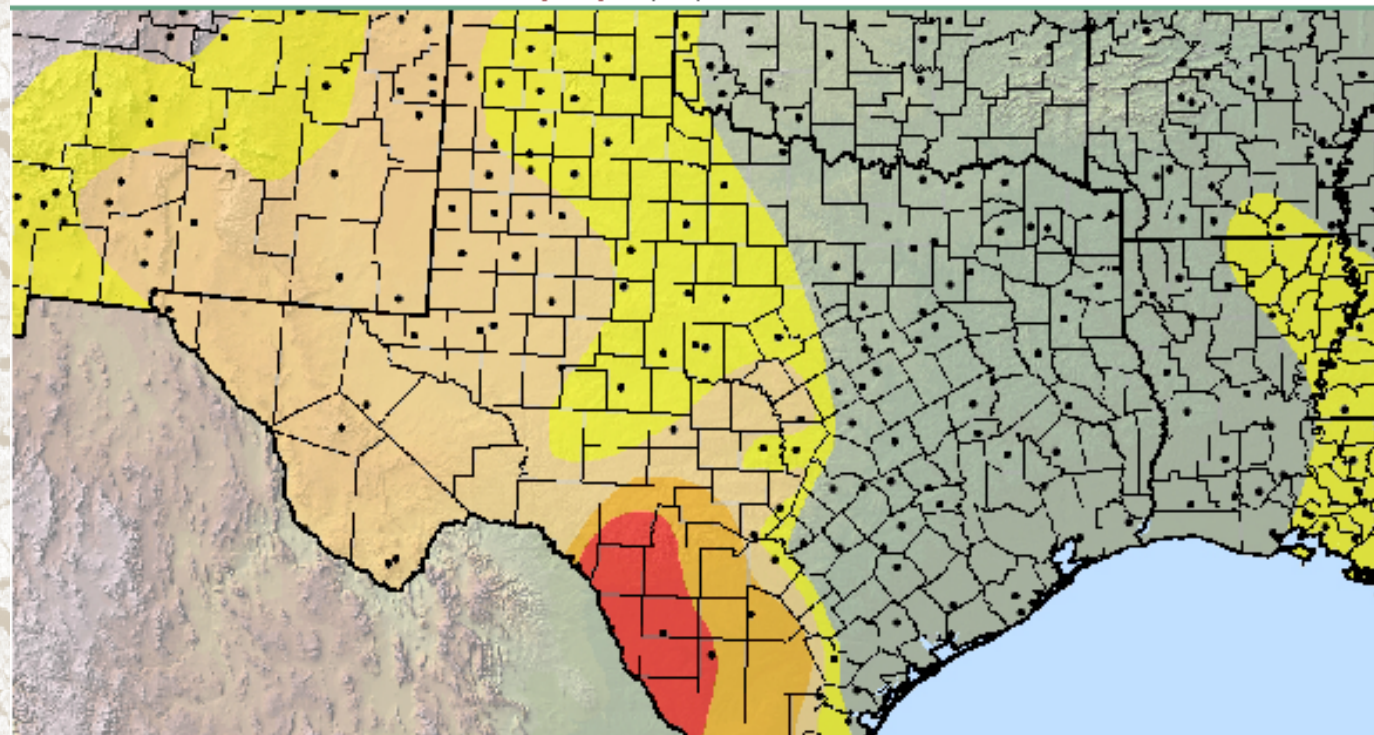
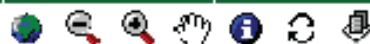
Bureau of Reclamation Reservoir Levels:  
<http://www.usbr.gov/gp/water/rflow.cfm>

USGS Real-Time Streamflow Data:  
<http://waterdata.usgs.gov/tx/nwis/rt>

## Legend

- Visible
- ☒ Drought Monitor
    - ☒ D0
    - ☒ D1
    - ☒ D2
    - ☒ D3
    - ☒ D4
  - Date
  - Transparency
  - ☐ ACIS Stations
  - ☐ Climate Layers
    - ☐ Standardized Precipitation Index
    - ☐ Palmer Drought Severity Index
  - ☐ Select Boundaries
    - ☐ Rivers
    - ☐ Hydrologic Units (HUCs)
    - ☐ Congressional Districts
    - ☐ Climate Divisions
    - ☐ Counties
    - ☐ Cities
    - ☐ Roads
    - ☐ County Warning Areas
    - ☐ States





☒ Continental United States

☐ Alaska

☐ Hawaii

☐ Puerto Rico

## Climate Links for Texas

Southern Regional Climate Center:  
<http://www.srcc.lsu.edu>

Bureau of Reclamation Reservoir Levels:  
<http://www.usbr.gov/gp/water/rflow.cfm>

USGS Real-Time Streamflow Data:  
<http://waterdata.usgs.gov/tx/nwis/rt>

## Legend

- Visible
- ☒ Drought Monitor
    - ☒ D0
    - ☒ D1
    - ☒ D2
    - ☒ D3
    - ☒ D4
  - Date
  - Transparency
  - ☒ ACIS Stations
  - ☒ Climate Layers
    - ☐ Standardized Precipitation Index
    - ☐ Palmer Drought Severity Index
  - ☒ ☐ Select Boundaries
    - ☐ Rivers
    - ☐ Hydrologic Units (HUCs)
    - ☐ Congressional Districts
    - ☐ Climate Divisions
    - ☒ Counties
    - ☐ Cities
    - ☐ Roads
    - ☐ County Warning Areas
    - ☒ States

About the  
Drought Monitor

Impacts

Animations

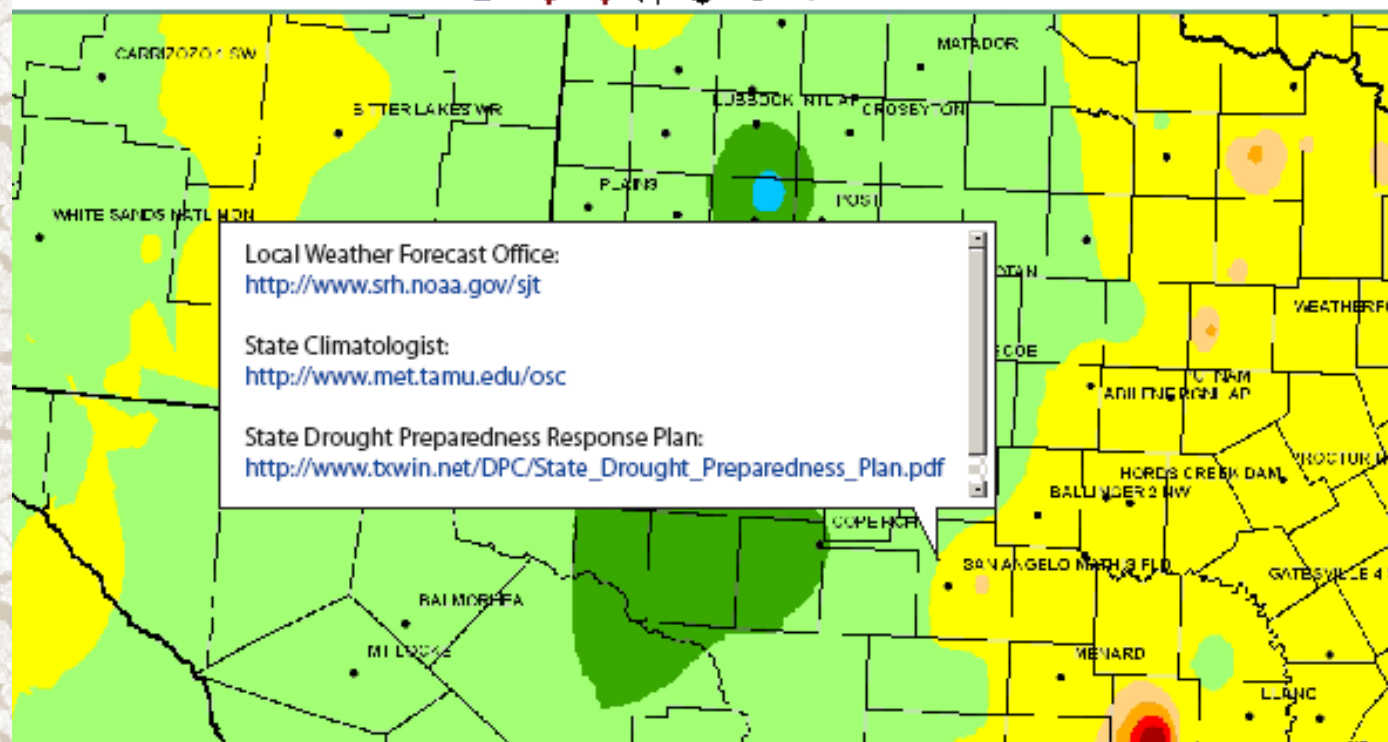
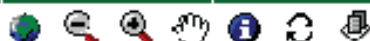
Current

Forecasts

Search the  
Archives

Submit Feedback

NIDIS



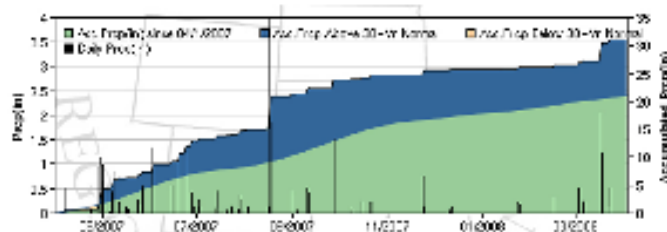
Continental United States

Alaska

Hawaii

Puerto Rico

Precipitation: January 2007-April 2008



Drought Impacts for San Angelo, TX

Fire Impact 1/3/2008

San Angelo, Texas—Tom Green county is one of 129 counties across Texas that have burn bans due to dry conditions as reported by the Texas Forest Service.

## Legend

Maple

[+] ☐ Drought Monitor

[-] ☐ ACIS Stations

● Station Name

[-] ☐ Climate Layers

☐ Standardized Precipitation Index

< -3

-3 to -2.5

-2.5 to -2

-2 to -1.5

-1.5 to -1

-1 to 0

0 to 1

1 to 1.5

1.5 to 2

2 to 2.5

2.5 to 3

> 3

☐ Palmer Drought Severity Index

[-] ☐ Select Boundaries

☐ Rivers

☐ Hydrologic Units (HUCs)

☐ Congressional Districts

☐ Climate Divisions

☐ Counties

☐ Cities

☐ Roads

☐ County Warning Areas



# Use of the DM in Decision Making

- USDA Dried Milk Program 2002-03
- USDA CRP Release hot spot trigger
- Numerous states use as a drought trigger (Governor's declarations)
- 2006 USDA Livestock Assistance
- 2006 IRS (tax deferral on livestock losses)

# National Drought Mitigation Center

University of Nebraska–Lincoln



The National Drought Mitigation Center (NDMC) helps people and institutions develop and implement measures to reduce societal vulnerability to drought. The NDMC, based at the University of Nebraska–Lincoln, stresses preparation and risk management rather than crisis management.

## What is Drought?

*An overview of drought • Climographs • Historical Palmer Drought index maps and graphs • Drought and El Niño • The Dust Bowl*

## Planning for Drought

*How (and why) to plan for drought • The 10-Step Planning Process • Directory of drought planning contacts*

## Monitoring Drought

*How to select monitoring tools • The SPI, the U.S. Drought Monitor, and links to tools elsewhere on the web*

## Understanding Your Risk

*Understanding drought's impacts • Drought Impacts in the United States • Drought impacts around the world*

## Mitigating Drought

*Putting a drought plan together • Existing drought plans and studies • Drought mitigation tools/initiatives • Water conservation*

About the NDMC  
Contact Information  
What's New  
Site Map  
Search the Site  
Drought Network News  
Publications  
Photo Gallery



*Drought  
for Kids*

For Media

Other  
Drought-related  
Sites

U.S.  
Drought  
Monitor

NDMC's  
Drought Impact  
Reporter

# Thank you!

Please visit us at:  
<http://drought.unl.edu/>

Please contact me at:  
**Brian Fuchs**  
[bfuchs2@unl.edu](mailto:bfuchs2@unl.edu)  
**402-472-6775**

UNIVERSITY OF  
**Nebraska**  
Lincoln



# DROUGHT MONITOR



drought monitor  
about us  
forecasts  
current conditions  
archive  
what's new?  
contact us

<http://drought.unl.edu/dm>